THE UNIVERSITY OF ALBERTA

ALTERNATIVE LAND USES IN SOUTHWESTERN ALBERTA: A STUDY IN NATURAL RESOURCE ECONOMICS

BY

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ABSTRACT

Land use conflicts among ranching, wildlife, and outdoor recreation are currently occurring in Southwestern Alberta. The most visible contentions arise between landowner and hunter. The resolution of these conflicts has to be approached while attempting to maximize social net benefits over time. In order to achieve this objective, current resource uses, alternative uses, and institutional and ecological constraints have to be evaluated in a social benefit versus social cost framework.

The study has determined that, although cash flow returns generally gave a reasonable standard of living, economic returns to land from ranching ranged from -23.66 dollars to 11.85 dollars per acre with an average return per ranch of 2.08 dollars per acre. Hunting and fishing net returns from wildlife combined with other outdoor recreation net returns amounted to approximately 2.8 million dollars annually. Conflicts among ranching, hunting and fishing, and other recreational activities are currently precluding certain complementary resource uses. At the same time there are locations within the region where biological competition exists. Public policy changes should attempt to resolve the social as well as the biological conflicts. Despite low economic returns to ranching only moderate land resource shifts from ranching to wildlife and certain forms of recreation should take place. The reasons for this include the high variability of economic returns to land from ranching and the incidence of social benefits and costs among all resource users in the region. Public policy should attempt to realign these social

benefits and costs as part of a comprehensive program. These measures include land consolidation, habitat improvement on both private and public land with rancher cooperation, greater public access, and guarantees to landowners against increased social costs that would otherwise be incident upon them. Increased communication between interest groups would help to facilitate the implementation of the integrated land management program in Southwestern Alberta.

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CHAPTER I

INTRODUCTION

Purpose

As society develops and grows shifts from extensive to intensive land utilization often occur. As these shifts take place, competition increases among alternative land resource uses. Mechanisms in the land market enable land allocation among commercial private uses, but these same mechanisms are unable to allocate land between commercial private and non-commercial public land uses. Particular types of outdoor recreation, as well as fish and wildlife land uses, are examples of public non-commercial uses. Land use conflicts among commercial, as well as among non-commercial uses, are occurring in Southwestern Alberta and will, in all likelihood, intensify. Such conflicts are usually resolved in an institutional framework, particularly through legal channels that often ignore economic considerations. Therefore, in order that public policy can be directed toward optimal use of society's natural resources, there is an increasing need for an economic evaluation of these resources. It is the purpose of this study to supply information on competing land uses in Southwestern Alberta and to suggest policies that would facilitate changes in resource utilization that are consistent with the overall objective of moving toward optimal use of these resources.[1]

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[1] Optimal resource use refers to a situation in which any re-allocation of resources or changes in resource development and management reduces the present value of social net benefits over time. Multiple use is a concept dealing with the co-existence of several resource uses on a common land resource. There are an array of such alternative uses of which only one represents an optimal use. Consequently, the term "multiple use" gives way to the use of the term "optimal use" but embraces the multiple use concept.

Context of the Problem

Southwestern Alberta is richly endowed with natural resources for which aggregate demand increases continuously thus leading to growing land use conflicts. Natural resources, both renewable and non-renewable, are the subject of conflicting demands for the land on which these resources are situated. Ranching, urbanization, watershed development, outdoor recreation, wildlife, lumbering, and mining for fuel and non-fuel minerals are all uses for which land resources in this region are an important input. These distinct and often competing uses are not the only cause for conflict. Conflicts arise due to inherent institutional effects such as land tenancy and property rights.

The most serious current conflicts in land use are centered on circumstances pertaining to ranching, wildlife, and outdoor recreation. The most visible contentions arise between landowner and hunter. By evaluating these resource uses and by looking at existing institutional and ecological constraints, changes in policies will be suggested that could result in improved resource use and management if implemented.

Objectives and Plan of Study

The objectives of the study are:

1) To describe the framework within which changes in resource use patterns are physically and biologically feasible,

2) To describe current public policy and other institutional factors that regulate resource utilization in the region,

3) To estimate the economic productivity of land from current use with particular emphasis on domestic livestock production,

4) To economically analyze and evaluate shifting resource use

in a social benefit versus social cost framework that will indicate direction of change, and

5) To formulate policy that would facilitate changes in resource utilization that are consistent with the overall objective of moving toward maximization.

The plan of the study stems directly from the objectives. The setting for the study is outlined in Chapter II by describing the region and existing institutional forces. The rationale for using certain biological and economic data required in meeting the study objectives is explained in Chapter III. Methods employed in data collection are also specified in this chapter. Chapter IV consists of data presentation and evaluation, along with the evaluation of land use alternatives. The study concludes with policy suggestions and specific needs for further research in Chapter V.

CHAPTER II

DESCRIPTION OF THE STUDY REGION

Boundaries of the Region

Problems arise when an attempt is made to rigidly specify the boundaries of a region for different purposes. Natural geographic boundaries and legal boundaries rarely coincide for two or more land uses. This is a problem with the designation of boundaries for land uses in Southwestern Alberta.

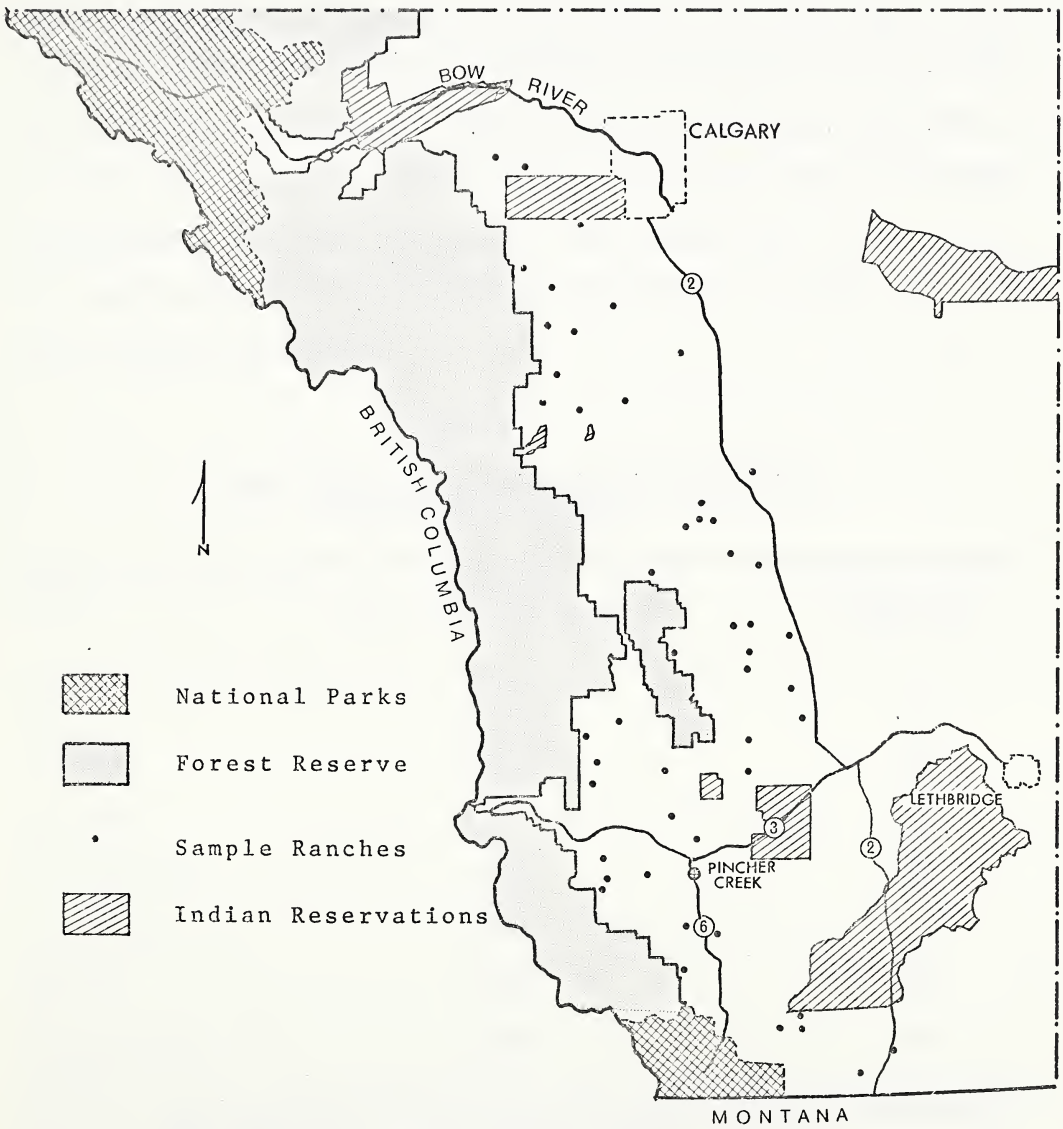
The intention is to include in the study region the foothills of Southwestern Alberta. For this purpose the study area, referred to as Southwestern Alberta, includes all provincially administered lands south of the Bow River, bounded on the east by Highway No. 2, on the south by the Alberta-Montana border, and on the west by the Alberta-British Columbia border (Figure 2.1). The notable federally administered lands are Banff National Park, Waterton Lakes National Park, and five Indian Reservations. The eastern boundary was somewhat modified in an attempt to follow the geographical change from prairie to foothills.

Geographic Description of the Region

The western edge of the region is lined with the massive and spectacular peaks and ridges of the Rocky Mountains. Moving east, the mountains become less rigid and grade into the foothills which flank the entire eastern slope. The combination of the massive Rockies and the high foothills with many lakes and rivers results in spectacular scenic beauty. Further eastward the foothills gradually lose height and incline, grading into the flat prairie of Southern Alberta. The Porcupine Hills

FIGURE 2.1.

SOUTHWESTERN ALBERTA STUDY AREA



are an anomaly to this continuum because they protract farther eastward into the surrounding prairie than do the other formations.

The region is drained by the South Saskatchewan river system which arises from such rivers as the Bow, Oldman, Elbow, and the Waterton. Major precipitation is from warm moisture-laden Pacific air but, as the region is in the rain-shadow of the Rockies, precipitation is not extensive and will vary between 18 inches to 26 inches annually--depending on altitude and distance from the mountains. Altitude is also an important determinant of the frost free period. The average frost free period for the region necessitates agricultural specialization in forage crops rather than in grain (Table 2.1).

TABLE 2.1

FROST FREE DAYS AND ELEVATION OF CENTERS IN SOUTHWESTERN ALBERTA

Town	Elevation (feet above sea level)	Average Frost Free Days
Banff	4,583	54
Calgary	3,540	109
Cardston	3,826	103
Fort Macleod	3,128	118
High River	3,800	58
Okotoks	3,448	85
Pincher Creek	3,758	98

Source: Alberta Bureau of Statistics, Alberta Industry and Resources, 1970 (Edmonton: Queen's Printer, 1970), pp. 6-7.

The region is characterized by high summer temperatures, low winter temperatures, and low relative humidity. Winter cold and snow are relieved by chinooks which are characteristic of the region. Occurring most often in fall, winter, and spring, warm Pacific air flows through mountain passes at speeds of 25 to 50 miles per hour. This is a welcome relief to domestic livestock as well as to wildlife.

As expected in rugged topography the soils are complex. The Black Soils of the lower foothills grade through grey luvisols into undifferentiated mountain complexes as slope, aspect, parent material, and terrain change. Vegetation changes in a similar fashion. The original fescue grasslands of the lower foothills have been disappearing due to the arability of the soils and the invasion of exotic grass species. Grasslands predominate on the southern slopes of ridges and valley. Forest and brush predominate on the northern slopes of ridges and valley. The poplar and willow found at lower altitudes surrender to lodgepole pine and firs at higher altitudes. There has been an apparent prairie invasion by aspen poplar and willow due to the decreased frequency of forest fires in the last few decades.

The vegetation is such that the region supplies valuable forage and browse for large populations of wildlife as well as for domestic livestock. The climate and vegetation combine to provide a high quality watershed that is evidenced by a large number of high quality streams and rivers. These waters are important not only for irrigation and municipal use farther downstream, but also as habitat for large numbers of cold water sports fish.

History of the Region

Southwestern Alberta has had a colorful history. This history has been presented by many authors.[1] With the signing of the Blackfoot Treaty in 1877 and the liquidation of the buffalo herds in the later seventies and early eighties, great cattle enterprises were established in the then Northwest Territories. Cattle were brought in from Montana and were grazed on vast leases granted by the Dominion Government to such famous name ranches as the Cochrane, the Northwest Cattle Company (later the Bar U), and the Oxley. In 1885 the Northwest Stock Association was formed, later becoming the Western Stock Growers' Association.

By 1875 the Royal Northwest Mounted Police had established law and order and in 1883 the C.P.R. was completed through Calgary. The ranching era was at its peak by the turn of the century. In 1905, with the establishment of the Province of Alberta and the onslaught of homesteaders, unfenced range was becoming limited. The appearance of homesteaders and the disastrous winter of 1906-1907, which liquidated three-quarters of the range cattle, concluded the last of the open range days. The ranching industry remained, but on a smaller scale, and was restricted to foothills rangeland.

Population of the Region

The population of the region is difficult to estimate due to the lack of superimposability of the irregular shaped region on country,

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[1] See: C.M. MacInnes, In the Shadow of the Rockies (London: Rigintons, 1930); W.G. Hardy, editor, The Alberta Golden Jubilee Anthology (Toronto: McCelland and Stewart Ltd., 1955); High River Pioneers and Old Timers Association, Leaves From the Medicine Tree (Lethbridge: The Lethbridge Hearld, 1960).

municipal, and census divisions. The population in the rural areas is scattered, as is customary for a population associated with an extensive land-based industry. The population of the region is located predominantly in the towns. The cities appear to be growing most rapidly, while many of the small towns are experiencing a decline (Table 2.2). Recreation areas in the Southwest are important to residents outside of the region, particularly to residents of Lethbridge.

Current Land Uses in Southwestern Alberta

Ranching

Ranching has a current importance in the Southwest as well as an historical importance. Cattle ranches in the foothills are extensive land-based grazing enterprises operating where land has little alternative agricultural use. The climate, soils, and topography of the region preclude other agricultural use. Recent information concerning management practices and economic characteristics of these enterprises is available elsewhere.[1]

The land requirement of ranches in Southwestern Alberta is composed from four dominant sources: deeded land, crown lease, Forest Reserve Permit, and private rental.[2] An estimated 6 percent of all ranches

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[1] See: Knud Elgaard, Cattle Ranching in Southern Alberta (Regina: Economics Branch, Canada Department of Agriculture, 1968); P.M. Moncrieff and W.E. Phillips, "Economic Status of Cattle Ranching in Southwestern Alberta" (unpublished manuscript under review for publication, University of Alberta, Department of Agricultural Economics and Rural Sociology, 1972).

[2] Deeded land refers to land held under private ownership. Crown lease refers to land held under longterm lease from the Lands Division, Alberta Department of Lands and Forests. The Forest Service, Alberta Department of Lands and Forests, issues an annual grazing permit to graze a specified number of animal units for a specified period within the Forest Reserve. Private rental refers to land held under a rental agreement from a deeded land owner.

TABLE 2.2

POPULATION OF CITIES, TOWNS, AND VILLAGES[a]

Cities	Population 1969	Percentage Change 1961-1969
Calgary	369,025	47.8
Lethbridge	38,749	9.2
Towns		
Black Diamond	923	-11.5
Blairmore	1,819	-8.1
Canmore	2,721	-2.8
Claresholm	3,167	47.7
Coleman	1,400	-18.2
High Riger	2,353	3.3
Nanton	940	-10.8
Okotoks	1,119	7.2
Pincher Creek	3,158	6.6
Stavely	317	-9.1
Villages		
Bellevue	1,174	-11.2
Cayley	143	-2.0
Cowley	181	42.5
Hill Spring	190	-21.8
Longview	173	N.A.
Turner Valley	730	3.9

[a]Population for 1969 from: Department of Municipal Affairs, Province of Alberta, Annual Report, 1969 (Edmonton: Queen's Printer, 1971). Population for 1961 from: Alberta Bureau of Statistics, Alberta Industry of Resources, 1970 (Edmonton: Queen's Printer, 1970).

operate on 500 acres or less; including deeded, leased, and rental land, but excluding Permit land. Approximately 16 percent of all ranches are greater than 6,000 acres in size.

The acreage range of 500 to 1,499 acres accounts for approximately 38 percent of all ranches in the Southwest, while the range of 1,500 to 6,000 acres accounts for an estimated 40 percent.[1] An average of 2,128 acres per ranch is patented with another 818 acres held in long-term lease (Table 2.3). Seventy-four percent of ranches hold some lease. An average of 255 acres is rented per ranch from private owners, but only 40 percent of the ranches rent some private land. The average size per ranch is 3,201 acres. In addition, an average of 200 A.U.M.'s (animal unit month)[2] of grazing is held per ranch under permit from the Forest Reserve. Forty-four percent of all ranches hold a Forest Reserve grazing permit.

Unimproved land accounts for 78 percent of the total land managed per ranch for all ranches in the Southwest. The percentage of unimproved land is 62 and 72 percent, respectively, for the size groupings of 500 to 1,499 acres and 1,500 to 6,000 acres (Table 2.3). Since 1962 there has been a 34 percent increase in improved land (from 275 to 368 acres) for the smaller group and a 61 percent increase (from 490 to 787 acres)

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[1]All information on ranching portrayed in this study was gathered by the author in conjunction with his research on land use problems. Most material quoted herein has been published in bulletin form to assure publication of information of a secondary nature to this study. See: Moncrieff and Phillips, "Economic Status of Cattle Ranching in Southwestern Alberta."

[2]One Animal Unit Month is defined as the forage required to graze one 1,000 pound mature cow with a calf less than six months old for one month.

TABLE 2.3

RANCH LAND UTILIZATION AND OWNERSHIP

	All Ranches[a]	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
Use			
		Acres	
Ranch site	10	5	15
Improved:			
Rented out	31	0	72
Crop	234	162	345
Hay	222	139	285
Improved pasture	203	67	85
Total	690	368	787
Unimproved:			
Native	2,384	581	1,934
Waste	117	26	76
Total	2,501	607	2,010
Total	3,201	980	2,812
Ownership			
Patented	2,128	682	2,062
Leased	818	223	377
Rental	255	75	373
Total	3,201	980	2,812
Permit (A.U.M.)	200	86	98

[a]Includes all size groupings, including those of less than 500 acres and greater than 6,000 acres. Ranches between 500 and 6,000 acres in size account for approximately 78 percent of all ranches in the region.

larger group.[1] In 1970, the average rancher felt that 294 acres could be improved in some manner. Improvements consist largely of clearing poplars and willows from potential grazing land. This clearing has had, and will likely continue to have, an effect on the availability of wildlife habitat.

Land values for grazing land are generally admitted to be in excess of the productive value of the resource. The average land value per ranch was estimated to be 132 dollars per acre for all ranches, 146 dollars per acre for ranches between 500 and 1,499 acres, and 122 dollars per acre for ranches between 1,500 and 6,000 acres. In the urban periphery of Calgary land values are substantially higher, with per acre values frequently exceeding 400 dollars.[2] Land values seem to drop as distance from the city and ruggedness of the land increases. Despite the discrepancy between productive value of grazing land and market prices, the range condition is reasonably good. Generally, the larger ranches take better care of the grazing resources than do the smaller ones.[3]

At year-end the average cattle inventory per ranch was 286.5 animal units of which 182.9 represented beef cows. Over the total sample the number of beef cows varied from 11 to 1,000 animal units. For ranches

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[1] Knud Elgaard, Cattle Ranching in Southern Alberta, p. 12.

[2] See also: R.J. Miller and W.S. Pattison, Rural Real Estate Value in Alberta, January-December, 1971 (Edmonton: Alberta Department of Agriculture, Resource Economics Branch, Economics Division, 1971), p. 30.

[3] Alex Johnston, Range Management Specialist, Canada Agriculture Research Station, Personal letter, Lethbridge, January 31, 1972.

with 500 to 1,499 acres, the range in beef cow units was from 11 to 140; for the larger ranches with between 1,500 and 6,000 acres, the range was from 75 ot 400 units with the averages being 70 and 160. The larger ranches appear to retain and feed more calves, as well as more yearlings, over winter (Table 2.4). With the year-end inventory, an inventory was calculated for the summer grazing period. The average grazing inventory for the total sample was 352 animal units per ranch and the range within the sample was from 32 to 1,555 animal units. Thus, the average ranch averaged approximately 9 acres per animal unit for the summer grazing period.

TABLE 2.4

LIVESTOCK INVENTORY

Item	All Ranches	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
		Numbers	
Beef Cows	182.9	70.0	160.2
Milk Cows	1.1	1.7	1.0
Bulls	7.8	2.8	8.6
Calves	122.5	29.7	121.0
Yearlings	27.4	1.3	31.0
Total	341.7	105.5	321.8
Cattle Animal Units[a]	286.5	93.9	266.3
Total Animal Units[b]	299.2	104.6	278.0
Grazing Animal Units	351.8	117.9	336.3

[a]See Appendix F for Conversion Factors.

[b]Includes other grazing livestock such as horses and sheep.

The extensive nature of the ranching industry in the Southwest works against close control over all parts of the ranching property. This, coupled with the fact that fence lines and the small number of existing roads do not necessarily follow legal survey lines due to the irregular topography, and with the recent development of all-terrain vehicles, makes it difficult for the rancher to look after all occurrences on the ranch. Increased traffic through the ranching country is of concern to the landowners. In several cases ranchers have banded together in protective associations enabling them to protect and look after their property more effectively. These associations are most active during the hunting season. The Western Stock Growers' Association has been active in voicing this concern to provincial policy makers.

Wildlife

Southwestern Alberta has many species of big game, upland game birds, water fowl, and fish. These resources provide outdoor recreation to many thousands of sportsmen. The habitat and species of wildlife found in the area are described elsewhere in some detail.[1]

The species of big game that are pursued for sport hunting are elk, mule deer, white tail deer, moose, and mountain sheep. Mountain

[1]See: Alberta Department of Lands and Forests, Fish and Wildlife Division, Fishing in Alberta (Edmonton: Queen's Printer, 1970); Alberta Department of Lands and Forests, Fish and Wildlife Division, Upland Game Birds of Alberta (Edmonton: Queen's Printer, 1969); Alberta Department of Lands and Forests, Fish and Wildlife Division, Cloven-Hoofed Animals of Alberta (Edmonton: Queen's Printer, 1969); Bob Jamieson, Big Game Inventory and Habitat Classification of Mountain and Foothill Portions of the Highwood, Elbow and Ghost River Drainages (Calgary: Alberta Department of Lands and Forests, Fish and Wildlife Division, 1969).

goats also inhabit the region but their numbers are believed to be few. The largest number of elk and mule deer taken in the province come from this region. Few counts are available to determine the population of each species, so an indication of trends in species numbers is generally unavailable. Populations are thought to be slowly declining due to intensive hunting pressure, improved accessibility, and disappearance of habitat.

The hunting pressure felt in Southwestern Alberta is the heaviest in the Province. While the region consists of only 3.1 percent of the provincial land area, it provides 10.1 percent of the hunter days in the Province (Figure 2.2). If the relative size of the region is compared to other regions in the Province, Southwestern Alberta has 23.5 percent of the hunting pressure which, estimated on a per square mile basis, equals 11.3 hunter days per square mile (see Figure 4.1 and Table 2.5). These values are considerably greater than those for the other regions of Alberta.

Sports hunting is a major tool in wildlife management. Hunting is a means by which the game population can be harvested by the removal of the shootable surplus. The tool's effect can be modified with variations in length of legal hunting season and in bag limits. Female seasons are utilized to maintain species when body size, health, growth, and fecundity approach a maximum. When these conditions are maximized, the productivity of the species is maximized. This is a point that appears to be poorly understood by the general public and the ranchers of the area. To manage wildlife so as to produce maximum output, a great deal of information about wildlife population, harvest rates, age structure, etc. must be known. With the limited biological staff of the

TABLE 2.5

DISTRIBUTION OF RELATIVE HUNTING ACTIVITY

Region	Estimated Hunter Days[a]	Estimated Area in Square Miles[b]	Relative Size of Region - %	Hunting Days Per Square Miles	Ratio of Pressure to Relative Size - %
1	14,509	78,275	32.4	0.2	0.4
2	135,757	39,621	16.4	3.4	7.2
3	120,607	15,462	6.4	7.8	16.3
4	39,747	7,248	3.0	5.5	11.5
5	84,374	7,489	3.1	11.3	23.5
6	82,258	12,079	5.0	6.8	14.2
7	65,963	26,091	10.8	2.5	5.3
8	195,754	30,440	12.6	6.4	13.4
9	97,360	24,884	10.3	3.9	8.2
Total Province	836,329	241,590	100.0	3.5	100.0

[a]Information from: R.J. Miller, Alberta's Hunting and Fishing Resources: An Economic Evaluation (Edmonton: Alberta Department of Agriculture, Resource Economics Branch, Economics Division, 1971), p. 29.

[b]The total provincial area was derived by subtracting the area of National and Provincial Parks from the total land area of the Province of Alberta.

FIGURE 2.2

DEFINED WILDLIFE REGIONS

Source: R.J. Miller, Alberta's Hunting and Fishing Resources: An Economic Evaluation (Edmonton: Alberta Department of Agriculture, Resource Economics Branch, Economics Division, 1971), p. 18.

Fish and Wildlife Division this information is not always known in great enough detail to manage game in small areas.

Another important tool in wildlife management is the provision and maintenance of habitat. Habitat is the most important factor influencing populations of wildlife species. To manage wildlife successfully, habitat must first be managed successfully. The carrying capacity of the habitat is usually the factor limiting game numbers. For effective management of game, control over the habitat is essential. In Southwestern Alberta control of the land is held by two parties--private landowners and the government. This situation is complicated by the legal provision that wildlife is a public resource and no individual may own the wildlife. Thus private landowners have very little incentive to manage game. This is especially true when private landholders experience both depredation by wildlife and inconveniences from public pursuit of game.

The streams of the foothills offer excellent trout fishing. Angling is best in early spring, but four to six weeks after break-up the open streams are nearly fished-out. There are basically two reasons for this: one is that the small streams do not carry large numbers of fish and, second, fishing pressure is heavy especially in accessible areas. The larger rivers in the lower foothills; the Bow, Elbow, etc., offer the most consistent success. One method of management that is practiced in the higher streams is stream closure. During alternate years different streams are closed to angling. This technique allows for the building up of fish populations in the closed streams but has the side effect of concentrating all of the anglers on the open streams. Angling in closed streams is an offense and convictions for this offence have been increasing in the last few years.

A stream inventory has been carried out in the south half of the study region.[1] There are an estimated 720 and 489 miles of permanent streams in the Pincher Creek and Claresholm districts respectively. In the Pincher Creek district, 88 percent of the stream miles were rated as having moderate to high sport fishing value. The estimate was 60 percent for the Claresholm district. The potential value of the streams was rated higher than the present use value. Eighty-seven percent of the stream miles in the Pincher Creek district were rated as having moderate to high angling pressure as compared to 48 percent in the Claresholm district. The estimated angling hours for permanent streams in each district were 5,482 hours in Pincher Creek and 2,267 hours in Claresholm. In the Pincher Creek district, 53 percent of the stream miles are estimated to be on patented land and 47 percent on crown land. In the Claresholm district, 35 percent was on patented land and 49 percent on crown land with 16 percent being unknown. Obviously, streams on private lands are of importance to the fisheries potential of the region. The majority of the damage to streams was felt to come from improper agricultural practices such as bank trampling, overgrazing, and clearing. The foregoing estimates should also be an indication of the situation in the northern half of the study region.

In 1969, 363,051 angling days, or 16 percent of the total provincial angling days, were spent in Southwestern Alberta (which is only

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[1] S. Clements, "Some Physical and Biological Features of Flowing Waters in the Lethbridge Subdivision," Lethbridge, Division of Fish and Wildlife, 1970. (Mimeographed.)

3.5 percent of the total land area in Alberta). In 1969, five of the nine watershed basins in the study region ranked in the top 20 of the 129 watershed basins in the province (Figure 4.2). These five basins accounted for 13.4 percent of the provincial total while representing only 2.2 percent of the provincial land area. Southwestern Alberta is obviously one of the most heavily fished regions in the province.

Recreation

The outdoor recreation potential of Southwestern Alberta has long been recognized, but use has been largely confined to the National Parks of Banff and Waterton Lakes. Visits to the major parks have been increasing at a rate of 12 percent annually and the parks are approaching their limit of use.[1]

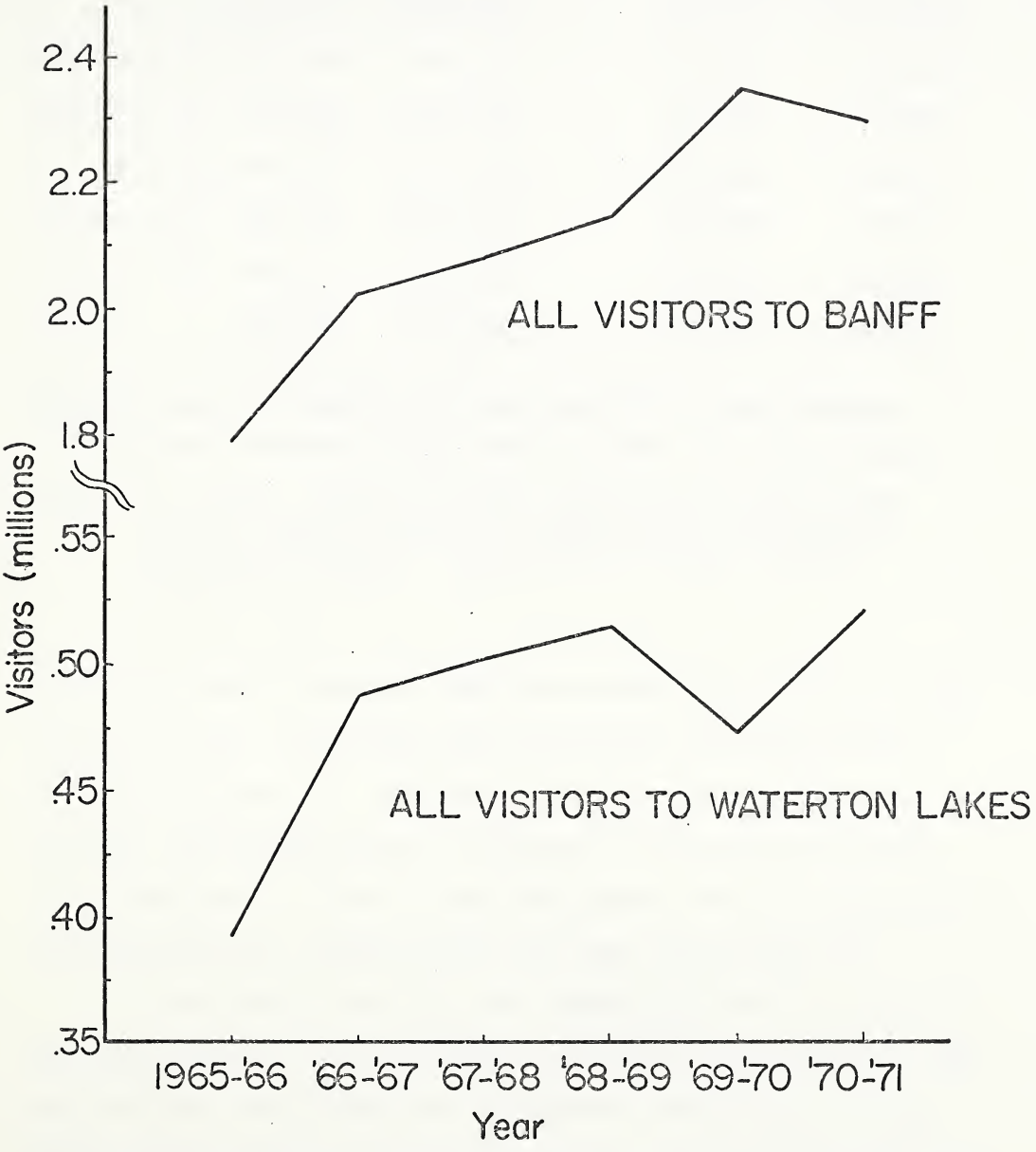
In the fiscal year 1970-71 Waterton Lakes had 520 thousand visitors while Banff had 2.3 million visitors and the trend in visits in both parks is upward (see Figure 2.3 and Table 2.6). As these developed areas approach their limit of use, recreationists will spill out into surrounding areas. The foothill region between the two parks, providing relatively the same types of recreational experiences, will be a natural expansion area. In fact the Forestry Trunk Road would provide an excellent tourist route between the parks. This type of expansion is currently going on.

The Forest Reserve offers recreationists a type of accessible wilderness that is no longer available in the National Parks due to increased popularity. The campsites are simple and rustic in design. The

[1] R.P. Malis, Regional Director, Natural and Historical Parks Branch, Canada Department of Indian Affairs and Northern Development, as quoted in the Edmonton Journal, February 7, 1972, p. 15.

FIGURE 2.3

NATIONAL PARK VISITORS



Source: R.P. Malis, Regional Director. National and Historic Parks Branch, Department of Indian Affairs and Northern Development, Personal communication, Calgary, Alberta, February 21, 1972.

TABLE 2.6

ALL VISITORS TO NATIONAL PARKS

Year	Banff		Waterton Lakes[a]	
	Vehicles	Passengers[b]	Vehicles	Passengers
1965-66	572,714	1,797,333	116,305	393,426
1966-67	650,855	2,021,045	145,498	407,589
1967-68	667,772	2,077,735	156,882	503,729
1968-69	793,760	2,147,425	155,766	516,112
1969-70	757,347	2,346,030	139,417	472,850
1970-71	760,500	2,303,852	149,557	520,330

[a]Waterton Lakes is normally only open from April to early October.

[b]"All Visitors" includes private vehicles, buses and railway traffic.

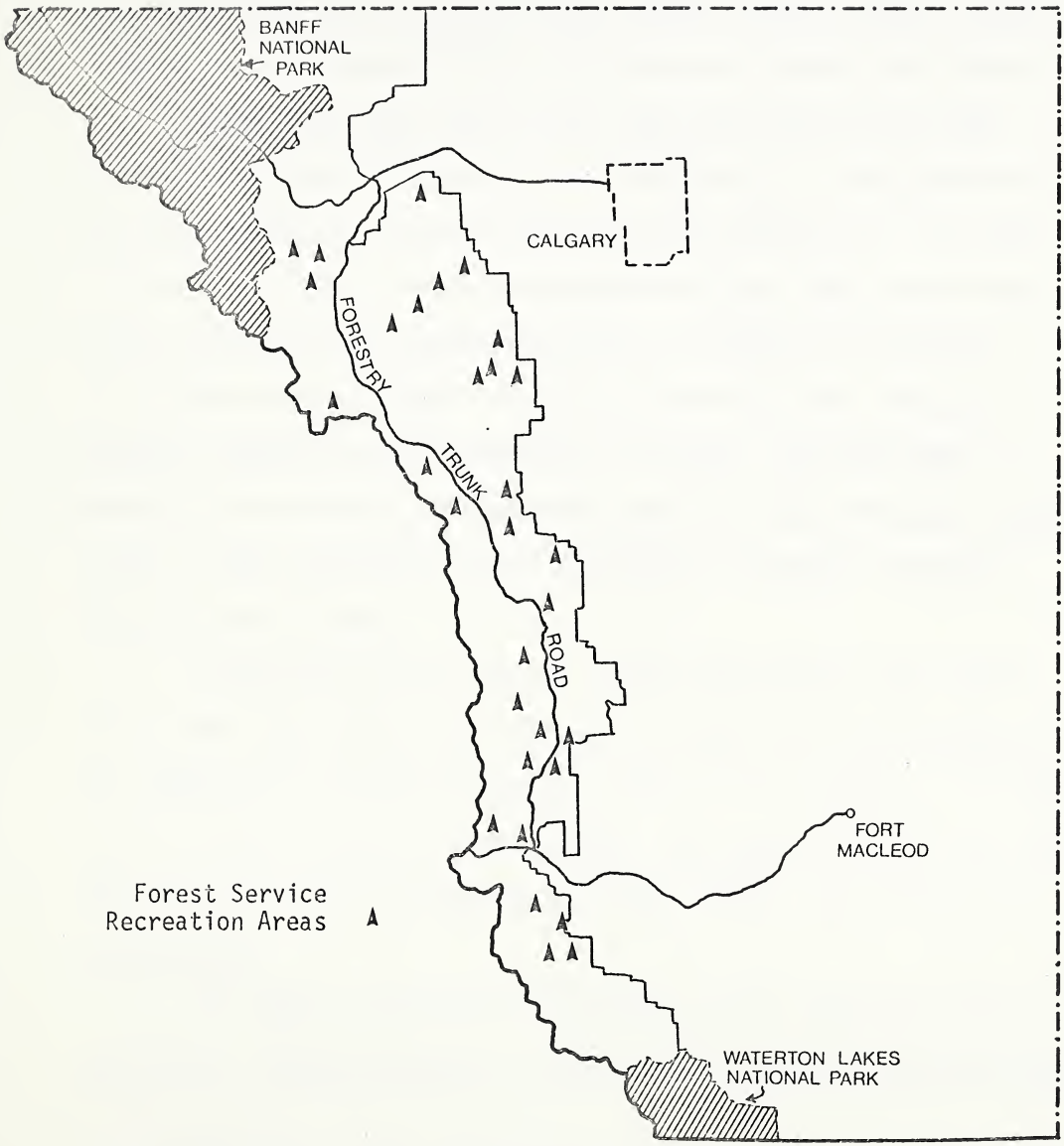
Source: R.P. Malis, Regional Director, Natural and Historic Parks Branch, Canada Department of Indian Affairs and Northern Development, Personal Communication, Calgary, Alberta, February 21, 1972.

twenty-nine Forestry campsites offer approximately 565 recreation sites (picnic, trailer, and tenting) with the majority along the Forestry Trunk Road (Figure 2.4). The Forest Reserve is also accessible from the east. This allows for use by residents in the population centres along Highway No. 2, as well as from the growing cities of Calgary and Lethbridge which are located within a two hour drive of the area.

A road running north and south outside the eastern boundary of the Forest Reserve is also beginning to be used by recreationists. This road provides a view of the prairies foothills rather than the higher forest covered foothills along the Trunk Road. Also, located along this

FIGURE 2.4

SOUTHWESTERN ALBERTA FOREST SERVICE
RECREATION AREAS



Source: Alberta Government Travel Bureau, Alberta Visitors Guide 1972 (Edmonton: Alberta Government Travel Bureau, 1972).

road is the Chain Lakes Provincial Park which is experiencing increasing recreational use. This is the most heavily utilized Provincial Park in the Southwest with approximately 130,000 visitors in 1970 (Table 2.7). The establishment of this park helped relieve fishing pressure along streams in the surrounding area as the lakes are stocked with trout.

Other Provincial Parks in the region are Bow Valley, Bragg Creek, Willow Creek, and Beauvais Lake (Figure 2.5). These parks are also experiencing increasing recreational use (Table 2.7).[1] The Provincial Parks, some of which offer electricity and sewage facilities, offer a more developed recreational site as compared to the Forest Service Recreational areas. As well as Provincial Parks there are community camping sites in several of the towns. The Department of Highways also maintains some nineteen campsites along the major highway routes. These campsites are used dominantly by tourists travelling along the major routes.

As mentioned in the section on fish and wildlife, the region offers many opportunities for recreational sports hunting and angling. The opportunity to observe wildlife in their native habitat is believed to be a strong attraction to the region. The scenic beauty of not only the fauna, but also the flora of the region, offers opportunities for photographers.

The summer recreational capabilities of the region are great and varied. Winter recreation in the region is beginning to be developed.

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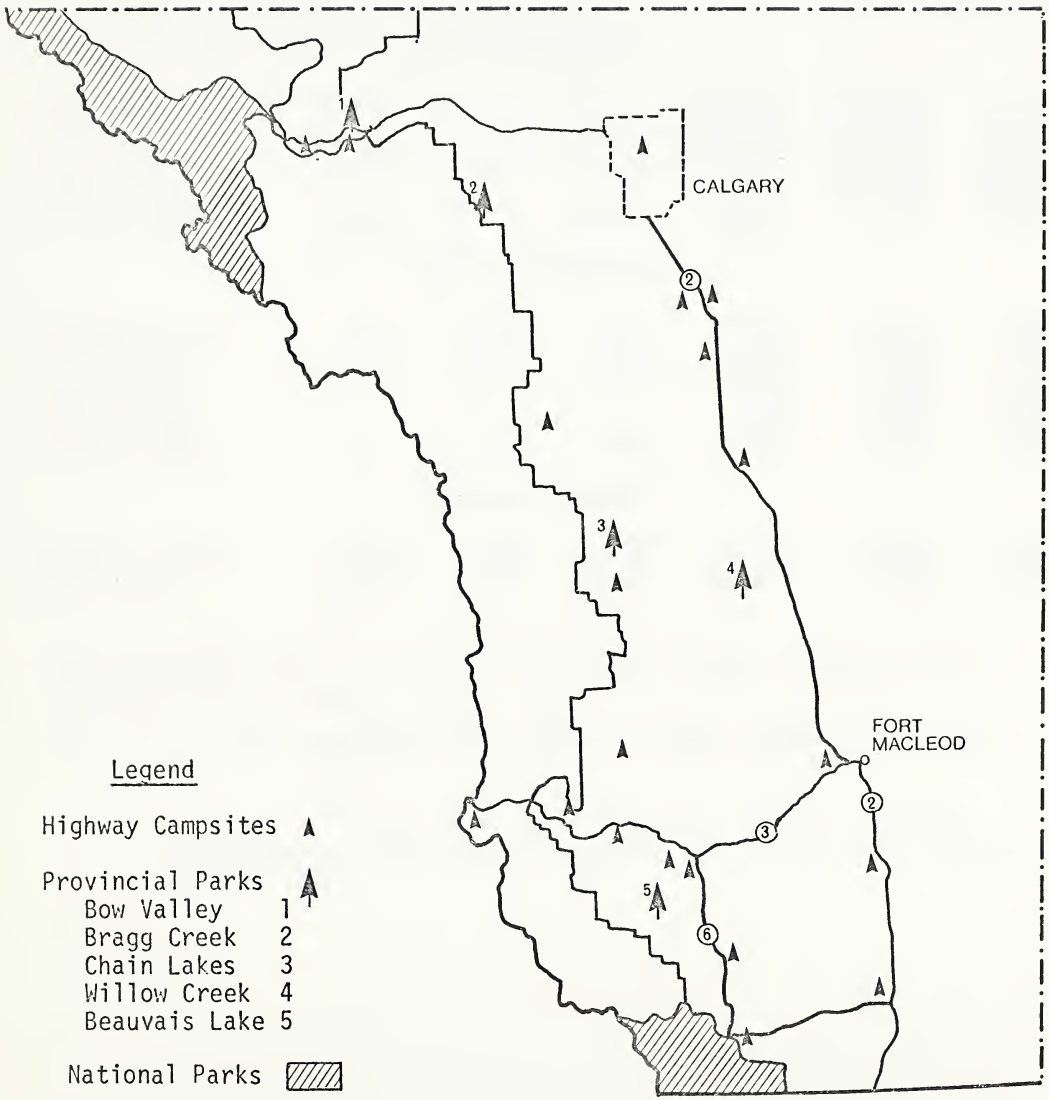
[1] The drop in the patronage count for Bow Valley is not believed to be an indication of a drop in attendance. The traffic counter was moved in 1970 resulting in a less inflated count than in previous years.

FIGURE 2.5

SOUTHWESTERN ALBERTA
PROVINCIAL PARK AND HIGHWAY CAMPSITES



Source: Alberta Government Travel Bureau, Alberta Visitors Guide 1972 (Edmonton: Alberta Government Travel Bureau, 1972).

TABLE 2.7

PROVINCIAL PARK VISITATIONS

Provincial Park	1965	1966	1967	1968	1969	1970
			Park Patronage[a]			
Beauvais Lake	30,756	52,434	57,751	62,084	48,564	73,528
Bow Valley	83,108	159,087	218,111	246,012	165,239	69,530
Bragg Creek	6,988	28,854	37,658	58,906	79,813	73,704
Chain Lakes	--	--	--	18,361	145,098	131,789
Willow Creek	11,094	19,935	32,884	35,291	42,764	48,047
			Tents and Trailers			
Beauvais Lake	847	1,035	659	1,134	1,367	1,665
Bow Valley	4,024	4,714	4,425	4,549	3,759	4,205
Bragg Creek	--	--	502	1,061	1,245	1,228
Chain Lakes	--	--	--	468	5,669	5,583
Willow Creek	--	964	896	1,193	1,781	2,921
			Patron Permits[b]			
Beauvais Lake	2,144	3,406	2,605	4,340	4,650	6,162
Bow Valley	14,586	17,374	15,687	16,343	13,348	14,681

[a]The patronage figure is derived from traffic counts multiplied by 4, representing the assumed average number of vehicle occupants.

[b]The permit figure represents the number of people camping overnight. These figures are assumed to be accurate by Parks officials.

Source: B. Munn, Parks Planning, Provincial Parks Branch, Alberta Department of Lands and Forests, Personal Interview, Edmonton, June 5, 1972.

power tobaggan clubs utilize the Forest Reserve and three ski hills have been developed. The potential for winter recreation appears to be excellent. There can be little doubt that in the future the foothills region of Southwestern Alberta will be of immense recreational importance.

Other Land Uses

Ranching, recreation, and wildlife are not the only uses for land in the southwest. Other uses include watershed protection, mining for both fuel and non-fuel minerals, and lumbering. The Forest Reserve is regarded as an important water catchment area since the headwaters of the prairie rivers are located on the eastern slopes of the Rockies. Oil and natural gas, along with coal, are the major energy resources found in the region. Coal mining is currently carried out around Coleman and Canmore. Industrial minerals, like limestone, are also found in the region. The Bow and Crowsnest Forests yield lumber and poles.

Institutional Considerations

Administration

This study is limited to the consideration of land administered by the Province of Alberta. For this reason the National Parks and Indian Reservations are excluded. However, this does not imply that these areas have no influence on land use. National Parks provide a sanctuary for wildlife and the native people are permitted to hunt game throughout the year. These have implications for wildlife management in the region, but detailed analysis of these and other problems is omitted from this study.

The study region is administered locally by municipal councils and boards in the improvement districts. These administrative units also

play a role in land use, but this role is not considered here.

The administration of Provincial lands is carried on by the following agencies.

Lands Division -- The Lands Division is responsible for the administration of all public lands not under the responsibility of the Forest Service. The Lands Division is of importance to this study because it is in charge of the administration of leases outside the Forest Reserve in Southwestern Alberta. The Division employs a number of staff in the Grazing Lease Administration Section.

All grazing leases in the open grasslands of Southwestern Alberta are utilized and the only method of obtaining a lease is through the purchase of a ranch currently holding a lease. There are provisions in the regulations to encourage the development and improvement of the leased lands by the leasees. These improvements usually take the form of brush removal or water improvements. The leasee may obtain financial assistance in the form of a credit on his lease rental account for a share of the cost of these projects.

Leases are granted for a period of five to a maximum of twenty years. The maximum acreage leased to any one individual or company is enough land to graze 600 head of cattle for twelve months. The rental fee for leases is annually based on a formula which takes into consideration the annual gain of beef per head, the average price of cattle, and the grazing capacity. The rental charges in 1970 were 14.75 cents per acre for land with a carrying capacity of twenty-four acres per animal unit year or 11.25 cents for land with a carrying capacity of thirty-two acres per animal unit year. This rental was down considerably from 1969. In 1970 the leasee was also responsible for paying the municipal

taxes on the leased land. Rental fees were adjusted downward so that the sum of rental fees and taxes were approximately equal to rental fees collected in 1969.

In addition to long term leases, the Division also grants an annual grazing permit on unoccupied lands. Permit rental fees and taxes are handled similarly to those for leases. There are few annual permits in existence in the Southwest.

The Public Lands Act, under which lease regulations are administered, makes provisions for appropriate conservation measures. Use of land is specified to be in accordance with proper range management and proper watershed management. Inspection of the leases are carried out by qualified personnel of the Division to insure against abuse.

Alberta Forest Services -- The Alberta Forest Service is in charge of the administration of all public lands in the forested sections of Alberta. Within the study region the Forest Service administers domestic livestock grazing, forest use and fire prevention, mineral exploration, watersheds, as well as recreational use. The Forest Service is currently undertaking the Foothills Resource Allocation Study, which is a detailed study of the resources of the foothills.

Within the Rocky Mountain Forest Reserve Grazing is permitted on an annual basis. The Reserve provided grazing for 83,986 animal unit months in 1970. The majority of this occurred south of the Bow River due to this region's vegetational characteristics as compared to the more densely treed regions to the north. The Porcupine Hills area is the most heavily utilized for grazing.

Recreation land use in the Forest Reserve has experienced a

dramatic increase over the last few years. In 1970, 236,680 dollars were spent on development, improvement, and maintenance of the ninety forest Service recreation areas in the Province. Twenty-nine of these areas are located in Southwestern Alberta. These areas are listed in Appendix A. Only rustic facilities such as table, fireplaces, and toilets are supplied in all areas.

The Forestry Trunk Road, originally built by the Forest Service as a forest access and fire road, is in the process of altering from Forestry Service use to public use. This road provides a natural scenic route from Waterton National Park to Banff National Park and future use is expected to increase. Sections of the road are already being upgraded due to heavy public use and in the future a total upgrading and paving program is envisaged.[1]

Because of increasing numbers of recreationists, cattle management in certain localities is becoming difficult. The practice has been to herd the cattle into the Forest Reserve allotments and let them run at large with very little supervision. Recreationists have been expressing discontent with seeing cattle in a semi-wilderness area and sportsmen have charged that poor management of cattle in the reserve is damaging watersheds and competing with wildlife for forage. On the other hand, ranchers have expressed concern over the increasing numbers of cattle lost to rustling, as well as the easy access the public has to all regions of the reserve that were formerly semi-isolated. The Forest

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[1]Tourism Minister Bob Dowling announced that the Alberta Government may spend 40 million dollars improving the Forestry Trunk Road for tourist traffic. Edmonton Journal, February 7, 1972, p. 15.

Service is aware of the growing recreation pressure and in some cases has been cutting back on the number of cattle allowed to graze in the reserve

Fish and Wildlife Division -- Within the Alberta Department of Lands and Forests, the Division of Fish and Wildlife is responsible for the management of wildlife and fisheries. As well as looking after those recreational resources, the Division is concerned with commercial operations such as commercial fishing and fur production. The Division enforces the Wildlife Act, Migratory Birds Convention Act, and the Fisheries Act. Normally the Division's expenses exceed revenues. For 1969 the expenses were 1.89 million and the revenues were 1.68 million. The expenditures have been steadily increasing over the years (Table 2.8). Both hunting and fishing activities have exhibited a steady, though fluctuating, increase. There has also been a steady increase in wildlife violations and the trend has been for ever-increasing fisheries violations and decreasing numbers of wildlife violations even though the Division is generally acknowledged to be understaffed with enforcement officers.

In the new Wildlife Act that came into effect July 1, 1970, the Division is also responsible for administration of the "Wildlife Damage Fund" and the "Fish and Wildlife Habitat Fund". Under the Wildlife Damage Fund landowners can claim for loss of or injury to livestock by hunters and for crop loss by wildlife--usually migratory birds. Under the Habitat Fund the habitats of wildlife can be maintained and created. This section of the Act has yet to be implemented. Revenues for these funds are provided from the sale of wildlife certificates (mandatory

TABLE 2.8

SELECTED ALBERTA FISH AND WILDLIFE STATISTICS

Year	1966-67	1967-68	1968-69	1969-70	1970-71
Number of Wildlife Certificates Sold[a]	106,132	124,028	119,978	117,408	128,708
Number of Angling Licenses Sold[b]	133,092	136,693	140,874	152,978	148,337
Fish and Wildlife Departmental Revenues($)	1,091,134	1,416,069	1,707,574	1,680,343	1,857,836
Fish and Wildlife Departmental Expenditures ($)	1,307,432	1,541,023	1,642,779	1,885,497	2,000,895
Wildlife Violations Resulting in Conviction	845	833	1,102	1,387	1,517
Percentage Hunting Violations	71.5	77.2	66.3	66.2	57.4
Percentage Fisheries Violations	28.5	22.8	33.7	33.8	42.6

[a]Indicates the total number of resident and nonresident hunters.

[b]Indicates the total number of resident and nonresident fishermen.

Source: Alberta Department of Lands and Forests, Fish and Wildlife Division, Annual Report (Edmonton: Queen's Printer, 1965-66 - 1970-71).

for hunters if a game hunting license is to be purchased) and from the sale of habitat stamps.

The Division employs a number of biologists and support staff who undertake research projects and advise on the setting of bag limits, hunting seasons, and other management practices. The fisheries section annually undertakes a stocking program of suitable lakes in the province, several of which are in the study area.[1]

Parks Division -- The Provincial Parks Division is a branch of the Department of Lands and Forests. This Division is in charge of administration and planning for Provincial Parks in Alberta, as well as for Historical Sites and Natural Areas. The study is concerned with five of the forty-eight parks in the Province.

The Provincial Parks are always open, but facilities are generally only available from the May 24 weekend to the Labour Day weekend. The capacity of the Beauvais Lake, Bow Valley, Bragg Creek, Chain Lakes, and Willow Creek Provincial Parks is approximately 890 camping sites (Table 2.9). Of the total area of Southwestern Alberta, the Parks only occupy a relatively small 3,700 acres. Since people often are difficult to contain, recreationists frequently make use of land adjoining the parks. This is particularly true at Chain Lakes where recreationists fish in the stream below the park boundary. As was evident from the section on recreation, the Provincial Parks have been experiencing a steadily increasing rate of use.

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[1]Department of Lands and Forests, Division of Fish and Wildlife, Fish Planting List (Edmonton: Queen's Printer, annuals).

TABLE 2.9

CAPACITY AND SIZE OF PROVINCIAL PARKS

		Sites			
	Acres	Trailer	Camping	Table	Fireplace
Beauvais Lake	369	200	200	760	147
Bow Valley	2,309	100	100	108	122
Bragg Creek	302	25	25	95	21
Chain Lakes	641	70	70	94	-
Willow Creek	76	50	50	109	19
Total	3,697	445	445	1,166	-

Source: Alberta Government Travel Bureau, Alberta Visitors Guide 1972 (Edmonton: Alberta Government Travel Bureau, 1972).

Interest Groups -- The two major and frequently opposing interest groups are the Alberta Fish and Game Association and the Western Stock Growers' Association. The basic tenets of these organizations and similar thinking groups are:

1. The Western Stock Growers' Association is an association of 3,500 Alberta cattlemen and is recognized as one of the leading voices in the ranching and cattle business. For several years the Stock Growers' have expressed concern over the growing conflict between recreationists and land owners. The Association feels that landowners should be compensated in some way for the supply costs of feed and habitat for game and for costs incurred by recreationists while pursuing their interests. One of the Association's suggested solutions is a "pay-to-hunt" system, under which the hunter would pay for the right to hunt on the property.

In 1971, in a consultant's report commissioned by the Association, the minimum requirements that the rancher and landowner should be assured are stated. These are:

a) his cost of supplying game will be covered,

b) that there is a procedure that gives him full knowledge of every hunter that has access to his property,

c) that he has control as to who comes onto the property and, as a consequence, has some control of the game kill on his land, and

d) that leasing of land from the Government of Alberta for grazing purposes should give the renter the same rights, in terms of control of hunters and recovery of supply costs, as applies to deeded land.[1]

While the most obvious contentions arise between hunter and landowner, this is not the complete problem. Indeed, the ranchers definition of a hunter includes not only a licensed sportsman, but anyone with a rifle in or out of season. The problem concerns trespassing on deeded or rented property by all members of the public--not just hunters. The problem also has another dimension in that wildlife is a public good and, therefore, does not only belong to the landowner. However, the ranchers of the Southwest realize that the demand for outdoor recreation is greatly increasing and would like to reach some agreement with the government and public that would protect their rights while providing more enjoyable recreational pursuits.

These problems are not just evident in the Southwest, but in the rest of Alberta. For example, Unifarm, the Alberta farmer organization, has voiced the concern of farmers in central Alberta with regard to crop

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[1] J. Paul Hedlin and Ralph Hedlin, Game Policy Needs in Alberta (Toronto: Hedlin, Menzies and Associates Ltd., 1971), p. 41.

damage by migratory game birds and by hunters in pursuit of these birds.

2. The Fish and Game Association has approximately 20,000 members in 112 local member clubs in the Province. The Association is concerned with hunting, fishing, conservation, and other matters of environmental concern.

The Association endorses the right of public ownership of wildlife and vigorously opposes any system or sale of these rights. The organization also feels that control of crown lands should rest solely with the public. Renters of crown lease should only have rights to the grazing rsource.

The right of landowners to control who enters their deeded property is supported by the Association. The Association has also continually pressed the Government for additional enforcment officers to protect both the landowner and resource from the abuse of indiscriminate users. The Alberta Fish and Game Association has recommended that:

a) The Government impliment a vertical plan to compensate landowners, farmers and ranchers who effectively protect, retain or create wildlife habitat on private land.

b) To meet this objective an immediate mandate be given to an advisory committee composed of farmers, ranchers and sportsment with Government to work out a formula similar to the home owner grant system to the effect that the application assessment and payment of funds [sic].

c) The Fish and Wildlife Habitat Fund be implemented by the imposition of a habitat fee on bird and deer licenses as well as angling licenses. Such funds should be used for wildlife habitat programs, as well as acquisition of land for stream bank protection and key wildlife areas which are not presently under public control.

d) That notice be given to the Government of Alberta for an early start to require first time hunters and violators to produce certification of knowledge and training before a hunting license is issued. It is our opinion that to assist in putting quality hunters in the field in Alberta that a progressive system of certification is needed for all hunters.[1]

Summary

The circumstances appear set for increasing conflict in land use in Southwestern Alberta. Increasing numbers of recreationists and sportsmen are forcing the ranchers to take individual and joint actions to insure the protection of their property rights. These actions include representations to the many governmental agencies concerned with land use administration within the region. The governmental agencies have also been approached by sportsmen expressing concern over detrimental effects from agricultural land use. There appears to be a need for a comprehensive government policy regarding land use in Southwestern Alberta.

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[1] Alberta Fish and Game Association, "Policy Statement Replacing Policy 1.6, 4.1, 4.2, and 3.1: Habitat Retention, Compensation to Farmers, Qualified Hunters," Edmonton, 1972. (Typewritten.)

CHAPTER III

CONCEPTUAL FRAMEWORK AND STUDY PROCEDURES

Introduction

The purpose of this chapter is to set forth the basic principles applying to the problem of land allocation among various uses and to specify what sorts of data were required and how the study was set up.

As stated in Chapter I, the primary objective of this study is to attempt to maximize net social benefits resulting from land use in Southwestern Alberta. Public decision makers seek to allocate resources to uses that will result in the greatest net social benefits, including both pecuniary and non-pecuniary elements. In the area of public policy, decision making using an incremental approach to maximizing net social welfare is usually observed.

Like profit maximizing firms, the public sector seeks to use resources in the production process until the marginal cost of each input equals its marginal value product; or stated in another way, until the cost of the last unit of input equals the value of the added products it produces. Natural resources are generally used in production processes that generate an array of goods and services. Their use for one array and quantity of goods and services usually precludes, at least to some extent, their use in alternative arrays and quantities of goods and services. The question of which is the best pattern of resource use always arises. Conventional economic theory defines best use as the use that provides for maximum social net revenue based on economic efficiency. Knowledge of factor prices and factor productivity is, therefore,

prerequisite to efficient allocation of resources. In reality, this knowledge is often scanty, particularly for natural resource inputs. There are also other impediments to efficient allocation. Monopolistic conditions in the market, non-price impediments, and institutional considerations all act as barriers.[1] Also, as publicly owned resources often include specific resources that present difficulty in evaluation (certain non-pecuniary resources), the process of efficient allocation of public resources is frustrated.

Impediments in the market may also cause discrepancies between allocation and incidence. Allocation refers to the foregoing discussion on efficiency, whereas incidence refers to the distribution of costs and benefits. The individuals who bear the costs may not necessarily be the individuals who benefits. Thus the economic problem has two parts--allocation and incidence. Collective action is often economically justifiable to alleviate problems of incidence.

The present study is concerned with the allocation of land among competing uses, as well as with the problems of incidence of benefits and costs from alternative uses. Frequently conflicts among uses arise due to incident problems even though there is a good deal of complementarity in allocation. In this chapter, three uses of land in Southwestern Alberta--agriculture, wildlife, and recreation--are discussed from an economic theory viewpoint. A review of the theory of conservation of natural resources, is followed by a discussion of benefit-cost analysis as

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[1] R.H. Lethwich, The Price System and Resource Allocation (Rev. ed.; New York: Holt, Rinehart, and Winston, 1962), Chapter 15.

can be applied to this study. The chapter concludes with the outline of the data requirements, questionnaire design, and sampling methods.

Conservation of Natural Resources

The concept of conservation used in this study is that developed by Ciriacy-Wantrup, who defines resource conservation in the context of the "when" of use.

> ... 'conservation' and its logical corollary but economic opposite, depletion, are defined in terms of changes in the intertemporal distribution of physical rates of use. In conservation, the redistribution of use is in the direction of the future; in depletion, in the direction of the present.[1]

Conservation is defined as a distribution of the rate of use of a resource in the direction of the future. Any given distribution of use rates is a state of conservation. The problem of conservation policy is to determine the optimum state or the temporal distribution of rates of resource use that will produce the maximum present value of the flow of net benefits, for the planning period.

The basic principle of conservation is that natural resources must not be managed primarily for the benefit of the resources themselves, but for society, both present and future.[2] Different land use patterns involve varying temporal distributions of social costs and benefits. The objective, as recognized in this study, is the maximization of the present value of social benefits net of social costs over time.[3] Future

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[1] S.V. Ciriacy-Wantrup, Resource Conservation: Economics and Policies (3rd ed.; Berkeley: University of California Press, 1968), p. 51.

[2] W.S. Pattison, "Moose Hunting Activity in Northern Alberta: A Case Study in Wildlife Economics" (unpublished M.Sc. thesis, University of Alberta, Edmonton, 1970), p. 15.

[3] Ciriacy-Wantrup, Resource Conservation: Economics and Policies.

net benefits are discounted to their present value. The validity of decisions based upon this objective depends upon the accuracy with which benefits and costs relevant to all alternative uses are enumerated and evaluated. Unlike private decision makers, who are only concerned with benefits and costs incident on the private firm, public planners must attempt to measure all social benefits and costs regardless of who receives or pays them. In reality the optimum state of conservation, a utopian goal, has never been achieved or even set forth in detail. Public planners seek temporal distributions of resource use rates and alternative resource uses that will move society incrementally along a path toward the optimal state of conservation.

The state of conservation is markedly influenced by both economic forces and institutional forces. Ciriacy-Wantrup discusses these forces in some detail.[1] These forces mold the state of conservation and may be obstacles or tools for designing appropriate conservation policy. Interest, time preferences, prices, income, taxation, and market form are some of the notable economic forces.

Perhaps the most important institutional force influencing the state of conservation for this study is property. Property is a "bundle" of rights of control. Individual "strands" of this bundle may be distributed among the public, the owners, the users, the creditors, etc.[2] A problem of indefiniteness of property rights exists for a special class of resources--fugitive resources. Wildlife is an important fugitive resource in that the resource has to be captured or reduced to possession

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[1] Ibid., Chapter 7 to Chapter 15.

[2] Ibid., p. 141.

to be of use. In the absence of public regulations this leads to resource depletion as exemplified by the disappearance of the plains buffalo. In Alberta, public regulations have been utilized as a means of solving the problem of indefinitness of property rights for wildlife.

Imbalance of property rights give rise to a distribution of revenues and costs for an individual that is different from the distribution of revenues and costs for the public. The individual is only interested in accounting for the benefits and costs accruing directly to him and is not interested in the benefits and costs accruing to others from his actions. How property rights influence the incidence of revenues and costs in resource utilization is an important factor in conservation decisions. For example, a private landowner has as a property right the right to exclude from his property members of the public interested in harvesting game. In this manner the landowner usually is taking account of only the benefits and costs accruing to him.

Tenancy, or the relationship between the owner and user of resources, is closely tied to property rights. Tenancy describes the situation where a property owner surrenders to a user certain of the "strands" in the property "bundle" for a limited period and for an economic consideration. The user is restricted in his rights of disposal and is greatly affected by the possible and actual use of the owner's rights of disposal. This uncertainty of tenancy influences the users conservation decisions as does the rate of payment for the use of the property.

The state of conservation is also influenced by other non-economic forces. Admittedly the differentiation between economic and non-economic forces is difficult to define. Accepting this restriction, social

institutions are thought of as more non-economic than economic. The point being made is that the influence of Parliament and pressure groups do play a role in the state of conservation and thus rate consideration in policies designed to move towards the optimum state of conservation. The public tries to take resource conservation into account by assigning priorities for grazing permits, cooperating with tenants in improvements, employing rents (grazing fees) variable with livestock prices, and insisting on lease clauses and regulations to avoid over grazing.[1]

Government (a social institution) becomes a relevant force in the determination of a optimum social state of conservation if resource use competition develops. An example occurs when the use of leased crown land becomes competitive among livestock, wildlife, and/or recreation. After a certain degree of use, depletion of the resource can only be avoided by limiting competition. It is only natural that the political influence of the tenants will be exercised in favor of reduction in wildlife populations and more stringent trespass regulations.[2] To avoid an imbalance of rights, a greater influence of interests, other than those of the leases, would seem desirable.[3]

As stated previously, the basic objective is the maximization of social net benefits which is identical to the optimal state of conservation. This rationale will permeate all further discussions of the three alternative resources uses of agriculture, wildlife, and recreation. Alternatives will be evaluated by means of benefit-cost analysis.

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[1] Ibid., p. 158-159.

[2] More stringent trespass legislation has recently been passed in Alberta and is contained in the Surface Rights Act. Administration of the Act has been placed under the jurisdiction of the Department of the Environment.

[3] Ciriacy-Wantrup, Resource Conservation: Economics and Policies, p. 159.

Benefit-Cost Analysis

The term benefit-cost has been alluded to in both the terms of private planners (revenues and expenses) and in the terms of social planners (social benefits and social costs). Although benefit-cost studies have most often been used for purposes of project evaluation, this type of analysis is applicable to a wide range of economic problems.[1] Benefit-cost analysis requires that values, usually expressed in monetary terms, be placed on all inputs and outputs involved for each alternative time distribution of resource use. This implies the specification of physical relationships for each alternative. The economic objective is to select that alternative with the greatest present value of direct social net benefit.

Benefit-cost analysis can make use of several analytical techniques depending on the nature of the problem to be dealt with. When analyzing a wide array of alternatives, the best analytical tool could be linear, non-linear, or dynamic programing. This study deals with a few discrete alternatives for which partial or total budgeting is the most appropriate technique of analysis.

In using benefit-cost analysis to study a resource situation, all benefits and costs should be identified and measured. These measurements may sometimes be difficult and often have to be approximated. In the following sections of this chapter measurement problems for the

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[1]For a discussion of the theoretical basis of benefit-cost analysis see: Otto Eckstein, Water Resource Development: The Economics of Project Evaluation (Cambridge: Harvard University Press, 1958), pp. 19-46; S.V. Ciriacy-Wantrup, "Benefit-Cost Analysis and Public Resource Development," Journal of Farm Economics, Vol. 37, No. 4 (November, 1955), pp. 676-689; A.R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," in Surveys of Economic Theory, Vol. 3, American Economics Association and the Royal Economic Association (New York: St. Martins Press, 1967),pp. 155-207.

various uses will be further discussed.

Agricultural Land Use

Agricultural land is used in combination with other factors of production to produce a flow of agricultural products. When the economic productive value (that is, the cost) of all factors of production, excluding land, are taken into account, along with associated revenue, there is usually a residual called economic rent. The flow of economic land rents over time reflects the productive value of this natural resource. The economic rents become capitalized into the fixed factor, which in this case is land. The summing of all future rental rates discounted to the present is the capitalization process. This sum represents the capitalized value of land in agricultural production or, as it is sometimes known, the productive value of the land. The economic allocation objective is to select that time distribution of use rates of land which is represented by the maximum present value of economic rent flows. As long as discrepancies between social and private costs and revenues are accounted for, this objective is consistent with maximizing social net revenue over time.

Economic rent flows are most relevant in determining the land use rates. Opportunity cost flows of alternative uses are important in determining land allocation. This study assumes that the current land use rates represents that time distribution which will yield maximum present value of economic rent in that use. This then enables comparisons with alternative land allocations.

The predominant agricultural land use in the study region is livestock grazing. From this observation the area has its greatest

agricultural competitive advantage in beef production. In this regard there is an important consideration that influences the use rate. The land is used to provide a flow of forage which constitutes the majority of the feed to support the livestock. This flow is characterized by a critical zone beyond which an increase in grazing intensity results in a degree of rangeland deterioration which cannot be econmically reversed.[1] Past this zone, the rent earning capacity of the land is greatly reduced, if not terminated. This aspect of land utilization must be included when considering alternative time distributions of use rates of land and also when managing other flow resources such as wildlife. The use rates of rangeland for cattle also have to be adjusted when the forage is being used for competitive uses. The case in point here is deleterious effects on given ranges due to competition between livestock and certain ungulates.

Consideration must also be given to the problem of dividing the capitalized income between public and private lands.[2] A major portion of public range lands are of limited worth without complementary privately owned lands. The reverse is also true. The public land may supply water without which adjoining private lands are worthless. The use of public land is not permanently attached to private land, but income has generally been capitalized as if it did. Severe losses could result in specific cases if the use of public land was lost.

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[1]Ciriacy-Wantrup, Resource Conservation: Economics and Policies, pp. 38-39, 256-257, 265-266.

[2]John D. Black, et al., Farm Management (New York: MacMillan Company, 1951), p. 753.

Wildlife

Land in Southwestern Alberta serves as excellent habitat for fish and wildlife. These resources provide benefit to society in both market and extra-market value terms. Fish and wildlife provide benefits derived from the harvesting of these resources through hunting and fishing. People also value the knowledge that wildlife exists in the wild state. Others gain satisfaction from the knowledge that they may take advantage of these resources at some future time. These publicly owned resources may be extremely important to Alberta but the market mechanism does not reflect effectively the value of fish and wildlife.

This study attempts to provide some economic values for the fish and wildlife resource of Southwestern Alberta that will enable policy makers to further understand allocation questions. Economic considerations are not the only relevant criteria for making decisions but this information will help to make management decisions for the benefits of society and not just for the resource users.

Economic values for fish and wildlife are very difficult to determine. This study will consider in detail only the values stemming from hunting and fishing activities.

The direct approach to resource evaluation is used here.[1] This

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[1] For a further discussion of the direct technique and indirect technique in Alberta refer to: W.S. Pattison, "Moose Hunting Activity in Northern Alberta" (unpublished M.Sc. thesis, The University of Alberta, 1970); J.H. Snipe, "The Ecological and Economic Impact of Water Resource Development in Southern Alberta: The Case of Fish and Wildlife" (unpublished M.Sc. thesis, The University of Alberta, 1970); R.J. Miller, "An Economic Evaluation of Alberta's Sport Hunting and Fishing Resources" (unpublished M.Sc. thesis, The University of Alberta, 1971); W.S. Pattison and W.E. Phillips, "Economic Evaluation of Big Game Hunting: A Case Study," Canadian Journal of Agricultural Economics, Vol. 19, NO. 2 (October, 1971), p. 72.

valuation technique attempts to determine willingness to pay for the resource on the part of the recreationist by asking him directly the magnitude in dollars of the benefits he receives.[1] From the point of view of society in general, the direct benefits are measured by the sum of the license fees plus extra-market benefits enjoyed by the participants.

Obtaining an approximation of extra-market benefits is probably the most serious problem facing those evaluating recreational resources. Extra-market benefits were determined by asking the recreationist: "Approximately how much do you think a day's hunting (or fishing) is worth above what you spend on travel and other expenses?"[2] Asking the recreationist directly the value of the extra-market benefits he receives provides an appropriate measure of value, for the recreationist is probably in the best position to determine the value of the benefits he receives. The confidence placed on this technique of evaluation while not error free, is deemed to exceed that obtained by indirect approaches.

From the point of view of society in general, direct costs are the development, management, and operation costs for the resource. Thus, the net social value for society in general is then determined by subtracting direct costs from direct benefits.[3] This valuation provides

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[1] Snipe, "The Ecological and Economic Impact of Water Resource Development in Southern Alberta: The Case of Fish and Wildlife", p. 45.

[2] In this manner the average value of a hunting or angling day can be estimated. Multiplying this average value per day by the total number of days hunted or fished yields the total value attributable to the resource.

[3] Indirect or secondary benefits and costs often used to measure regional economic impact are not used in this study as they largely represent regional and sectoral transfers that are assumed to have little or no net effect on the welfare of society in general.

a measure of the flow of net social benefits received directly in one year by all those who hunted or fished in the region. The total value of the resource could be measured by the capitalization of annual net benefits. This has not been undertaken in this study due to the questionable validity of assuming continuation of the current annual benefit flow in perpetuity.

This evaluation of social net benefits will provide valuable insight for policy makers at a macrolevel on allocation problems. However, policy decisions may have to be tempered with several additional considerations.

One major consideration influencing policy decisions is the fact that fish and wildlife are not available in unlimited quantities. Fish and wildlife are renewable resources, which stated another way means these resources are available over succeeding time periods.[1] Minimum flows must be assured to guarantee their availability in the succeeding time periods. Human action plays a part in increasing or decreasing these flows. Interaction with other competitive land uses will also play a role in determining future flows.

Another consideration arises from a more direct application of incidence. All costs are not included in the evaluation of social net benefits. Costs in excess of revenue obtained from license fees may be borne by the taxpayer. Costs associated with the provision of habitat may rest with individual private land owners. These land owners may also bear additional costs associated with the harvesting of the resources by licensed hunters or anglers. An attempt is made to consider

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[1] Ciriacy-Wantrup, Resource Conservation Economics and Policies, pp. 37-38.

these land owner costs from an incidence point of view, but not from the point of view of allocation. However, these costs do pertain to allocation decisions.

Outdoor Recreation

Certain areas in Southwestern Alberta provide excellent opportunities for recreation. The type of recreation offered is essentially land-based as was observed in Chapter II. Therefore, in considering the land allocation problem, benefits from recreational land use have to be appraised.

The recreational benefits derived from land occur in many ways. Benefits accrue to people driving through the area. Satisfaction also arises from one day excursions through the region by any means of transportation, whether by foot or vehicle. Others gain satisfaction from knowledge that the resources exist and from the knowledge that at some future occassion they may take advantage of these recreational resources. The foregoing benefits are very difficult to evaluate and for the purposes of this study are neglected. This study measures the benefits accruing to recreationists who utilize the provided recreational facilities for overnight camping and day use. These benefits provide a rough measure of the value of the recreational resources of Southwestern Alberta.

Since there is very little private provision of recreational activities in the region, most recreational services are provided by government agencies. The costs of providing these services are met largely by the taxpayer. No user charges or entrance fees are charged for any of the Forest Service recreational areas and only at Beauvais and

Bow Valley Provincial Parks is a user charge levied. Additional costs, from spillover effects from these areas, are borne by private land owners situated next to recreational areas. Also, all recreational activities are not solely confined to designated public recreational areas. These costs will be further detailed in Chapter IV.

The method of arriving at net direct benefits for the recreation resource for activities other than hunting and fishing is the same as the method used in measuring the net direct benefits from wildlife. The net direct benefits associated with recreational resources are the benefits received by the vacationers from their recreation experiences (measured by the user charges plus extra-market benefits) less the costs incurred by development, operation, and maintenance of the recreational areas.[1] No absolute dependence should be placed in this method, but the method will indicate if the recreational experience is worth more than is currently paid and also will give a rough indication of the magnitude involved.

Double-counting benefits from wildlife and outdoor recreation land use may be possible. In evaluating benefits, differentiation between benefits accruing to wildlife and recreation is difficult particularly between anglers and recreationists. A camper may also be an angler. However, the problem is not deemed of sufficient magnitude to alter the results.

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[1] A detailed discussion of recreation evaluation with regard to Alberta Provincial Parks in Southern Alberta is included in the draft manuscript of the M.Sc. thesis being completed by P. Whiting, Department of Agricultural Economics and Rural Sociology, University of Alberta, Edmonton.

Summary

The economic problem is one of adjusting allocation of land in a manner such that the marginal valuation for each land use is the same for all uses. This is consistent with the overall objective of conservation policy, which is to determine the temporal distribution of rates of use that will provide the maximum present value of the flow of net benefits over time. To this end the first step is to evaluate land allocation in the present. The next step is to look at the effect of incremental changes in use for an indication of the direction of change required to meet this end.

The evaluation of resource uses is carried out with the use of benefit-cost analysis. A constraint is placed on allocation decisions by the nature of the resources in question. Agriculture, wildlife, and recreation are flow resources that are characterized by a critical zone. Avoidance of this critical zone may be useful in evading possible costly situations in the uncertain future.

Due to the absence of competitive market mechanisms that indicate consumers willingness to pay for resources with extra-market value, these values must be estimated. The necessarity of deriving estimates, even with risks of inaccuracy, does not remove the need for evaluation, because of the necessity of such knowledge in problem solving.

The allocation problem coincides with the problem of incidence. The inequitable distribution of benefits and costs also has to be dealt with in land use decisions. This distribution is particularly important from the point of view of public planners.

Upon this conceptual basis the need for specific data to meet the objective of the study is apparent. The closing section of this chapter outlines the procedures utilized in the collection of relevant data

Study Data Requirements

Specific data requirements arise directly from the conceptual framework. Economic data from the three land uses under consideration are required to evaluate the efficiency of land resource allocation in each use. In addition, data are required to evaluate questions of incidence. Not all the required information will be quantifiable and much information will have to be obtained by relying on the opinions of qualified personnel. The data requirements and methods of collection for each resource are specified below.

Ranching

Ranching information requirements arise directly from the conceptual discussion of agricultural land use. In order to obtain the productive value of land on a per acre basis, complete budget information had to be gathered from the ranching industry in Southwestern Alberta. This information was gathered on the basis of a "normal" or "typical" year to avoid yearly effects and to avoid resampling over a period of years. In addition to complete budget information, measures of recreational pressure, conflicts, wildlife numbers and trends, as well as ranch land use information, was gathered. Information was gathered by completing questionnaires with the direct assistance of ranchers selected on a random basis.[1]

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[1]The Rancher Questionnaire is included in Appendix G.

In order to sample on a random basis, the rancher population was first established. This population was compiled from three sources. A list of all lease holders and permit holders of crown land was obtained from the Lands Division, Alberta Department of Lands and Forests. To this list were added the names of all grazing permit holders in the Forest Reserve. These were obtained from the Alberta Forest Service, Alberta Department of Lands and Forests.[1] To complete the population, all private land holders owning more than one section were added from municipal ownership maps of the area.[2] A master list of 759 ranches was compiled in such a manner as to avoid duplication. From this population a random sample of fifty ranchers were interviewed, giving a sample percentage of 6.4 percent. The distribution of the sample ranches is designated in Figure 2.1. (Although some of the ranches may appear to be outside of the study boundaries, it should be noted that the dot only marks the site of the ranch home buildings and not all of the land controlled by the ranch.)

Wildlife

In 1968 and 1969, the Department of Agricultural Economics and Rural Sociology, University of Alberta, in cooperation with the Division of Fish and Wildlife, Alberta Department of Lands and Forests, collected

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[1]Excellent cooperation and help were provided not only from Lands and Forests, but also from the Departments of Agriculture, Environment and Highways.

[2]One section was the lower limit placed on patented land holders as this was assumed to be the smallest acreage that could sustain a ranching operation without access to crown range.

primary economic data with regard to hunting and fishing in Alberta.[1] Access to these data for 1969 was obtained and utilized in evaluating benefits accruing to sportsmen from hunting and angling in Southwestern Alberta. Information was also available on the distribution of hunting and fishing pressure within the study region. Additional data on conflicting uses and other opinions of sportsmen were obtained from the Alberta Fish and Game Association which represents a sizeable number of hunters and anglers within the Province. The biological staff of the Fish and Wildlife Division also contributed information on conflicts of use and on wildlife management within Alberta. These sources of information aided in establishing the ecological and current policy frameworks that influence land use in Southwestern Alberta.

Outdoor Recreation

Economic information on outdoor recreation was obtained for the five Provincial Parks in the region and for the Forest Service recreational areas. Primary data from the Provincial Parks in Southern Alberta were collected by the Department of Agricultural Economics and Rural Sociology, University of Alberta, in 1970.[2] Data for the parks in the Southwest were obtained from this source and included information on visitor days, willingness to pay, and degree of satisfaction derived from the recreational experience. In this way the benefits per visitor

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[1] For a description of methods of data collection and the resulta from Alberta and Southern Alberta refer to: Miller, "An Economic Evaluation of Alberta's Sport Hunting and Fishing Resources"; Snipe, "The Ecological and Economic Impact of Water Resource Development in Southern Alberta: The Case of Fish and Wildlife."

[2] A description of the methods of data collection and the results of the study on Provincial Parks in Southern Alberta is included in the draft manuscript of the M.Sc. thesis being completed by P. Whiting, Department of Agricultural Economics and Rural Sociology, University of Alberta, Edmonton.

day and total visitor benefits could be calculated. Information on costs and total visitors were obtained from the Parks Division, Department of Lands and Forests.

To meet the data requirements for the Forest Service recreation areas a questionnaire similar to the Parks questionnaire was distributed to a random sample of recreationists in the Forest Reserve. In a manner similar to that used for the Parks analysis, benefits per visitor day were obtained and utilized to obtain total benefits from recreational use in the Forest Reserve. Nineteen questionnaires representing 44 visitors were obtained by randomly sampling recreationists at the recreational areas in the summer of 1972. Total recreationist counts were unavailable for the Forest Reserve but approximations were made from traffic counts.

CHAPTER IV

ECONOMIC EVALUATION

Land Use Evaluation

Evaluation for Agricultural Production

As stated in Chapter III, the economic productive value of agricultural land in Southwestern Alberta can be measured by capitalizing the annual flow of economic rent. This capitalized value of land or productive value of land is assumed to represent the time distribution of use rates which maximize the present value of the economic rent flow. Calculations of the capitalization value of ranch land in Southwestern Alberta were made for the purpose of comparing the return from land used for ranching purposes with those from alternative uses.

Average net annual returns from ranch land in Southwestern Alberta have been reported by implementing the three grouping system used in Chapter II.[1] The average dollar return per acre per ranch over all ranches sampled was 2.08, while the average dollar return per acre per ranch in each of the subgroupings was -1.96 in the 500 to 1,499 acre size group, and 1.08 in the 1,500 to 6,000 acre size group (Table 4.1). The capitalized value of all ranching land averaged 34.83 dollars per acre and for ranches between 1,500 and 6,000 acres the average was 18.67 dollars per acre. Fifty-six percent of all ranches had negative returns per acre; the remaining 44 percent of all ranches had positive returns ranging from

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[1]The complete economic description of ranching in Southwestern Alberta can be found in: P.M. Moncrieff and W.E. Phillips, "Economic Status of Cattle Ranching in Southwestern Alberta" (unpublished manuscript under review for publication, University of Alberta, Department of Agricultural Economics and Rural Sociology, 1972).

TABLE 4.1

AVERAGE NET ANNUAL RETURNS TO LAND FROM RANCHING
IN SOUTHWESTERN ALBERTA

Item	All Ranches[a]	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
		Average Dollars Per Ranch	
Gross Operating Revenue[b]	42,126	14,859	39,000
Total Expenses[c]	35,443	16,779	35,951
Net Return to Land	6,683	-1,920	3,049
		Average Acres Per Ranch	
Total Acres[d]	3,206	980	2,812
		Average Dollars Per Ranch	
Net Returns Per Acre	2.08	-1.96	1.08

[a]Includes all size groupings including those 6 percent of all ranches with less than 500 acres and those 16 percent with greater than 6,000 acres. The size group of 500 to 1,499 acres includes 38 percent of all ranches and the 1,500 to 6,000 acre size group includes 40 percent of all ranches.

[b]Less livestock and feed purchases.

[c]Total Expenses include charges to all inputs, excluding land and livestock and feed purchases. Charges are made for management, (8 percent of gross operating revenue), investment (6 percent), and labour (3,600 dollars annually for operator). See Appendix B.

[d]Total Acres include all deeded,rented, or leased acres, but does not include Forest Reserve Permit land.

0.54 dollars per acre to 11.85 dollars per acre.[1] Only 20 percent of the 500 to 1,499 acre size group had positive returns as compared to 58 percent of the 1,500 to 6,000 acre size group.

In spite of the fact that 44 percent of the ranches have positive returns from land, the prevalence of low or negative returns per ranch are an indication that beef production is an unprofitable use of much of agricultural land in Southwestern Alberta. Similar results have been obtained in other Canadian and American studies.[2] The apparent contradiction between the low productive values for rangeland with high market values and the high demand for crown grazing rights could be explained by including in the computations the values of land appreciation, income tax saving, opportunities for using financial leverage, as well as attitudes of rural fundamentalism.[3] These complexities are not included in the budgeting process used. As most ranches operate on a cash flow basis, these complexities tend to offset the apparent economic conclusions and

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[1]For a listing of returns per acre and capitalized value for the sample see Appendix B. Additional data used in the calculations of net returns are also in Appendix B.

[2]See: Knud Elgaard, Cattle Ranching in Southern Alberta; B.K. Acton and E.D. Woodward, Cattle Ranching in the Interior of British Columbia, Economics Division, Canada Department of Agriculture, 1961; A.H. Smith and W.E. Martin, "The Socioeconomic Behavior of Cattle Ranchers with Implications for Rural Community Development in the West," American Journal of Agricultural Economics, Vol. 54, No. 2 (May, 1972), pp. 217-255.

[3]Smith and Martin, "The Socioeconomic Behavior of Cattle Ranches With Implications for Rural Community Development in the West"; Don Boswick, "Financial Returns in Agriculture," American Journal of Agricultural Economics, Vol. 51 (August, 1969), pp. 662-664; and William E. Martin and Gene L. Jefferies, "Relating Ranch Prices and Grazing Permit Value to Ranch Productivity," Journal of Farm Economics, Vol. 48 (May, 1966), pp. 223-242.

thus tend to perpetuate the industry.[1]

Evaluation of Wildlife

In 1969 an estimated 17,233 resident hunters and an estimated 237 non-resident hunters spent 82,864 and 1,553 days, respectively, hunting in Southwestern Alberta (Table 4.2 and Table 4.3). These estimates indicate that the average resident hunter hunted 4.8 days and the average non-resident hunter hunted 6.6 days. Within the region the majority of the hunting (25.6 percent) was estimated to take place west of Pincher Creek in Wildlife Management Unit (W.M.U.) 302 (see Figure 4.1 and Table 4.4). On a respective area basis the heaviest concentration of hunter days was also in W.M.U. 302 (Table 4.4). The largest proportion of elk in Alberta were harvested in Southwestern Alberta, as well as the largest proportion of mule deer.[2] The ungulate harvest in the region is estimated to be 12 percent of the total provincial harvest (Table 4.5). The number harvested by residents far exceeds that of non-residents.

In 1969 an estimated 40,800 resident anglers fished for an estimated 359,300 days in Southwestern Alberta (Table 2.4 and Table 4.6). An estimated 944 non-resident anglers fished for 3,744 days (Table 4.2

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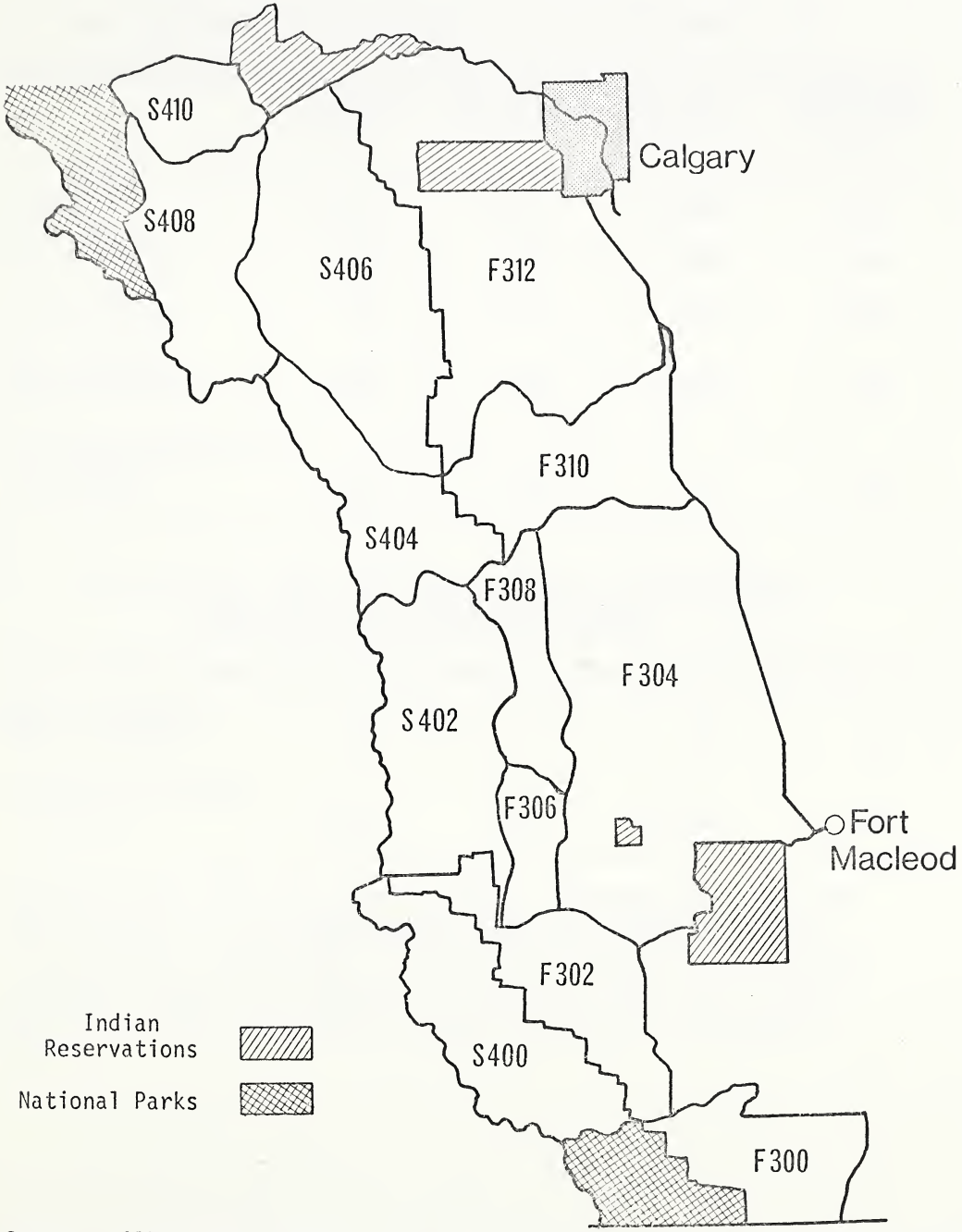
[1] On a cash flow basis the average return on all ranches to investment and operator labour and management is approximately 22,133 dollars. This amount does not include any cash flow charges for interest and principle on outstanding loans which would reduce this amount. Similar figures for the 500 to 1,499 acre group and the 1,500 to 6,000 acre group are 6,254 dollars and 18,106 dollars respectively, It is on this basis that ranchers can maintain a living standard higher than economic returns (returns to land) would indicate. In other words they are living off their capital investment including land appreciation (Appendix B).

[2] Miller, Alberta's Hunting and Fishing Resources: An Economic Evaluation, pp. 46-49; Also, for Provincial totals see: Miller, "An Economic Evaluation of Alberta's Sport Hunting and Fishing Resources," p. 39.

FIGURE 4.1

SOUTHWESTERN ALBERTA WILDLIFE MANAGEMENT UNITS



Source: Alberta Department of Lands and Forests, Fish and Wildlife Division, 1969 Summary of Game Regulations, (Edmonton: Queen's Printer, 1969).

TABLE 4.2

THE 1969 POPULATION OF HUNTERS AND ANGLERS AND SAMPLE SIZE[a]

	Resident Hunters	Nonresident Hunters	Resident Anglers	Nonresident Anglers
Population	109,835	7,573	147,550	5,427
Number Sampled	10,678	736	12,087	1,446
Percent Sampled	9.7	9.7	8.2	26.6
Number Useable Questionnaires	2,267	288	2,452	322
Useable Questionnaires as Percent of Population	2.1	3.8	1.7	5.9

THE ESTIMATED 1969 POPULATION OF HUNTER AND ANGLERS AND SAMPLE SIZE IN SOUTHWESTERN ALBERTA

Number of Useable Questionnaires	355	9	677	56
Estimated Population in Region	17,233	237	40,783	944

[a]Population data from: Province of Alberta, Department of Lands and Forests, 20th and 21st Annual Report (Edmonton: Queen's Printer, 1969 and 1970). The balance of the data was based on a mail survey carried out by the Department of Agricultural Economics and Rural Sociology, University of Alberta in cooperation with the Fish and Wildlife Division, Department of Lands and Forests, Government of Alberta.

TABLE 4.3

ESTIMATED NUMBER OF HUNTER AND ANGLER DAYS IN ALBERTA AND SOUTHWESTERN ALBERTA, 1969

Item	Alberta	Southwestern Alberta	Percentage Share in Southwest
Resident Hunters	783,840	82,864	10.6
Non-Resident Hunters	52,495	1,553	3.0
Total Hunter Days	836,335	84,417	10.1
Resident Anglers	2,240,400	359,307	16.1
Non-Resident Anglers	28,160	3,744	13.3
Total Angler Days	2,268,560	363,051	16.0

Source: R.J. Miller, Alberta's Hunting and Fishing Resources: An Economic Evaluation (Edmonton: Alberta Department of Agriculture, Resource Economics Branch, Economics Division, 1971), p.26 ; R.J. Miller, "An Economic Evaluation of Alberta's Sport Hunting and Fishing Resources" (unpublished M.Sc. thesis, University of Alberta, 1971), p. 36 .

TABLE 4.4

DISTRIBUTION OF HUNTING ACTIVITY IN SOUTHWESTERN ALBERTA, 1969[a]

Wildlife Management Unit	Resident Hunter Days	Non-Resident Hunter Days	Total Hunter Days	Percentage Share Per Region	Pressure Percentage on a Relative Area Basis
300	1,990	553	2,543	3.0	5.0
302	21,117	474	21,591	25.6	30.5
304	13,641	0	13,641	16.2	5.7
306	1,214	0	1,214	1.4	5.0
308	3,447	79	3,526	4.2	9.0
310	4,175	26	4,201	5.0	5.6
312	13,689	263	13,952	16.5	8.0
400	777	0	777	0.9	1.0
402	3,155	0	3,155	3.7	3.3
404	340	0	340	0.4	0.5
406	9,563	0	9,563	11.3	7.2
408	6,650	0	6,650	7.9	8.4
410	3,106	158	3,264	3.9	10.8
Total	82,864	1,553	84,417	100.0	100.0

[a]Note: The distribution of hunting activity is not as well defined as is the distribution of fishing activity. From the questionnaires it was difficult to explicity determine in which W.M.U. a particular hunter hunted. Thus, this distribution gives a rough estimate and should be treated accordingly.

TABLE 4.5

ESTIMATED UNGULATE HARVEST IN SOUTHWESTERN ALBERTA

Species	Resident Harvest	Non-Resident Harvest	Total Harvest	Percent of Provincial Total
Elk	1,323	105	1,428	37.2
Moose	1,076	-	1,076	5.3
Whitetail Deer	955	-	955	8.2
Mule Deer	2,106	26	2,132	19.7
Total Ungulate	5,460	131	5,591	12.0

Source: R.J. Miller, Alberta's Hunting and Fishing Resources: An Economic Evaluation (Edmonton: Alberta Department of Agriculture, Resource Economics Branch, Economics Division, 1971), pp. 45-49.

FIGURE 4.2
SOUTHWESTERN ALBERTA WATERSHED BASINS

Source: Alberta Watershed Basin Map courtesy of the Water Resources Division, Alberta Department of Environment.

TABLE 4.6

DISTRIBUTION OF ANGLING ACTIVITY IN SOUTHWESTERN ALBERTA, 1969

Watershed Basin	Resident	Non-Residents	Total	Percentage Share Per Region	Pressure Percentage on a Relative Area Basis[a]
5AA	108,554	1.602	110,156	30.4	12.1
5AB	5,904	0	5,904	1.6	0.7
W 1/2 5AD	28,644	118	28,762	7.9	5.8
5BE	20,361	455	20,816	5.7	9.5
5BF	43,434	1,046	44,480	12.3	28.2
5BH	30,542	34	30,576	8.4	7.9
5BJ	56,747	236	56,983	17.5	26.6
5BK	603	0	603	0.2	0.5
5BL	64,518	253	64,771	17.8	8.7
Total	359,307	3,744	363,051	100.0	100.0

[a]While the most relevant calculation would be on a stream mile basis, the relative area of the watershed basins should provide an indication of fishing pressure.

and Table 4.6). These estimations indicate that residents fished for an average of 8.8 days compared to an average of 3.9 days for non-resident anglers. Angling activity in the region composes 16 percent of the total angling days in the Province (Table 4.3). Within the region, 30.4 percent of the angling activity takes place in the Oldman, Crowsnest, and Castle drainage basins in Watershed Basin 5AA (Figure 4.2). However, on a relative basis, the heaviest fishing takes place in Watershed Basin 5BF (the Kananaskis Lakes and Kananaskis River) with the second heaviest fishing occurring in Watershed Basin 5BJ (the Elbow River Watershed). On a relative area basis, a 5AA is the third heaviest fished watershed. The remaining regions are fished on a lesser scale (Table 4.6). Fishing pressure will vary from year to year within the region as stream closures (a fishing management tool) vary from year to year.

The value of wildlife and fishing resources were evaluated, in 1969, from the viewpoint of society by measuring the direct benefits and costs of hunting and fishing. Of the total 2,820,900 dollars of social benefits, 92.3 percent were derived from extra-market benefits experienced by the hunters and anglers, with only 7.7 percent being attributed to license sales. License sales are reported by provincial total and so were allocated to the region on a percentage share of activity as compared to the total Provincial sporting activity.[1]

Wildlife and fishery management costs were allocated in a similar manner. The management costs for the region are slightly greater than the share of returns from license sales for the region. The total direct costs of the fish and wildlife resources in the region were 246,700 dollars in 1969. The annual social net benefits to society from hunting and fishing

[1] See Appendix E for 1969 License Fees.

in Southwestern Alberta were estimated to be 2,574,300 dollars in 1969 (Table 4.7).

In 1968 the net social benefits received from the fish and wildlife resources of Southern Alberta (defined as the drainage basin of the Southwestern Saskatchewan River) was estimated to be 7,956,082 dollars.[1] If a similar net return was true for 1969, Southwestern Alberta contributes approximately 33 percent of the net benefits acquired by the Southern portion of the Province. The social net benefits from wildlife hunting and sport angling for Alberta was estimated to be 23,408,400 dollars in 1969.[2] Southwestern Alberta contributed an estimated 11 percent of this amount.

The annual social net return of an estimated 2.6 million dollars from the sport hunting and fishing resources of Southwestern Alberta cannot be disregarded in policy decisions concerning resource allocation.

Evaluation of Recreation

Within the study region recreation facilities in the form of parks and campsites are provided by Provincial Parks, Forest Service Recreation areas, and Highway Campsites. Some camping facilities are also supplied by towns in the region. Major camping and recreation facilities are supplied in the National Parks of Banff and Waterton Lakes which border the study region (Figure 2.4). For the purposes of this study attention has been focused only on the Provincial Parks and the Forest Service Recreation Areas in Southwestern Alberta.

Total visitation counts for the Provincial Parks are undependable

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[1]Snipe, "The Ecological and Economic Impact of Water Resource Development in Southern Alberta: The Case of Fish and Wildlife", p. 56.

[2]Miller, "An Economic Evaluation of Alberta's Sport Hunting and Fishing Resources", p. 49.

TABLE 4.7

THE SOCIAL BENEFITS AND COSTS TO SOCIETY FROM WILDLIFE HUNTING AND SPORT FISHING IN SOUTHWESTERN ALBERTA, 1969

Item	1969
Direct Social Benefits	
License Sales	
Resident Hunters	138,944
Non-resident Hunters	18,165
Resident Anglers	58,850
Non-resident Anglers	1,930
Extra-Market Benefits	
Resident Hunters	852,670
Non-resident Hunters	12,933
Resident Anglers	1,724,675
Non-resident Anglers	12,766
TOTAL SOCIAL BENEFITS	2,820,933
Direct Social Costs	
Wildlife Management Costs	94,024
Fishery Management Costs	152,583
TOTAL SOCIAL COSTS	246,607
SOCIAL NET BENEFITS	2,574,326

as they are obtained by traffic counters with the counts scaled upward by an estimation of vehicle occupants. Very much depends where the traffic counter is placed in the park. Counts on the number of tents and trailers are more reliable as they are taken every night by park staff. At Beauvais and Bow Valley Parks charges are made for camping and at these parks there is also a count made of people in each party. From these counts the number of night users of the Parks can be obtained with reasonable accuracy. However, this is not so with the day users. Chain Lakes appears to have the heaviest user pressure of the parks in the Southwest with, for example, 313,789 patrons in 1970 (Table 4.8).

The average benefit per visitor day for parks in the Southwest was 0.67 dollars.[1] The average visitor stayed 2.2 days and the average family size for these five parks was three. The total patronage count was arrived at by inflating the traffic count by a factor of 4 times, this being the assumed number of occupants per vehicle. Table 4.8 shows a deflated count based on the average number of three per vehicle. This estimate is probably high, also.

Using the revised visitation figure for the parks in Southwestern Alberta and the average benefit per visitor day of 0.67 dollars, a direct benefit of 199,290 dollars for the year 1970 can be calculated. The total direct costs of administration, maintenance, and development for the provincial parks in Southwestern Alberta are 304,686 dollars (Table 4.9). This results in a social net loss to society of 105,396 dollars (Table 4.10).

[1] Information obtained from data collected by P. Whiting, Department of Agricultural Economics and Rural Sociology, University of Alberta.

TABLE 4.8

PROVINCIAL PARK PATRONAGE IN SOUTHWESTERN ALBERTA, 1970

Park	Total Patronage[a]	Revised Visitation Days[b]	Percentage Share	Tents and Trailers[a]	Percentage Share
Beauvais Lake	73,582	55,146	18.5	1,665	10.7
Bow Valley	69,530	52,148	17.5	4,205	27.0
Bragg Creek	73,704	55,278	18.6	1,228	7.8
Chain Lakes	131,789	98,842	33.2	5,583	35.8
Willow Creek	48,047	36,035	12.2	2,921	18.7
TOTAL	396,598	297,449	100.0	15,602	100.0

[a]Counts were provided by the Provincial Parks Division of the Alberta Department of Lands and Forests.
[b]A factor of 0.75 is used to deflate the visitation total.

TABLE 4.9

PROVINCIAL PARK DIRECT COSTS, 1970

Park	Estimated Share of Administration Costs[a]	Maintenance and Development Costs	Total
Beauvais Lake	20,554	19,886	40,440
Bow Valley	51,385	25,964	77,349
Bragg Creek	15,415	10,549	25,964
Chain Lakes	68,513	45,891	114,404
Willow Creek	35,970	10,559	46,529
TOTAL	191,837	112,849	304,686

[a]Administrative costs were allocated on a basis of percentage share of tents and trailer patronage.

TABLE 4.10

THE SOCIAL NET COSTS TO SOCIETY FROM PROVINCIAL PARKS IN SOUTHWESTERN ALBERTA, 1970

Item	1970
Direct Social Benefits	199,290
Direct Social Costs	304,686
Social Net Costs	105,396

A questionnaire similar to the questionnaire used in the Provincial Parks survey was utilized in the Forest Reserve Survey. Through random sampling of recreationists in the Forest Service Recreation Areas, a visitor day was found to be worth an estimated 1.68 dollars. The average family size was found to be 2.3 persons, the average group size was found to be 2.6, and the average length of stuay was found to be approximately 3 days. When asked to evaluate 1) the over-all area, 2) the facilities, and 3) the natural surroundings on a scale of 1 to 5 (high and low), the average responses were respectively: 2.74, 2.95, 1.11. This indicated a slightly above average degree of satisfaction with the over-all recreation area and facilities and a very high degree of satisfaction with the natural surroundings. Recreationists in the Provincial Parks, when asked for a similar evaluation, evaluated the over-all area at 2.4, the facilities at 3.0, and the natural surroundings at 1.8. While recreationists are apparently less satisfied with the over-all area in Forest Service recreation areas, the high degree of satisfaction with the natural surroundings appear to be worth substantially more to recreationists in the Forest Reserve than to recreationists in Provincial Parks.

Maintenance of 90 developed Forest Service recreation areas in 1970 cost 90,930 dollars. A total of 145, 750 dollars was spent in the redevelopment, expansion, or improvement of 34 resting facilities and an additional 29,290 dollars was spent developing two new recreation areas, one of which is in the study region. If maintanance and development costs were shared approximately equally between the 90 recreation areas, the share of direct costs for the 29 recreation areas in Southwestern Alberta would be approximately 90,856 dollars. This is

considerably greater than a similar estimate for 1969 of 20,052, dollars. The increase was both in development and in maintenance costs.

Forestry Trunk Road traffic counts were obtained from the Alberta Forest Service and the Alberta Department of Highways (for the specific counts see Appendix C). While these counts are not in detail, they provide a rough estimate on the number of private vehicles using the Forestry Road. There are, however, other roads into the Forest Reserve. The road west of Bragg Creek Provincial Park along the Elbow River and the road into Spray Lakes have considerable recreational use. Traffic on all roads is particularly heavy on weekends. From the available traffic counts and the assumed similar traffic on other roads in the Forest Reserve, there is an estimated 470 private vehicles per day going into the Forest Reserve. This value represents a rough average over the four month period from June to September.

Using this four month summer period with 470 cars per day and 2.3 occupants per car, there are an estimated 129,702 recreation visitor days in the Forest Reserve in Southwestern Alberta. Valued at 1.68 dollars per visitor day, the direct benefits accruing to recreation in the Forest Reserve is estimated at 217,930 dollars. The annual social net benefits accruing to society from recreation in the Forest Reserve of Southwestern Alberta is estimated to be 127,074 dollars (Table 4.11).

The annual net benefits from recreation in Southwestern Alberta from the Provincial Parks and the Forest Reserve amounts to 21,604 dollars (Table 4.12). The social net benefits derived from the Forest Reserve offsets the social net cost of the Provincial Parks. The social returns from investment in recreation appear to be favourable, especially

TABLE 4.11

THE SOCIAL NET BENEFITS TO SOCIETY FROM RECREATION IN THE FOREST RESERVE IN SOUTHWESTERN ALBERTA

Item	Value
Direct Social Benefits	217,930
Direct Social Costs	90,930
Social Net Benefits	127,074

TABLE 4.12

THE ANNUAL SOCIAL NET BENEFITS TO SOCIETY FROM RECREATION IN SOUTHWESTERN ALBERTA

Item	Value
Direct Social Benefits	
Provincial Parks	199,290
Forest Recreation	217,930
TOTAL SOCIAL BENEFITS	417,220
Direct Social Costs	
Maintenance and Development of Provincial Parks	304,686
Maintenance and Development of Forest Recreation Areas	90,930
TOTAL SOCIAL COSTS	395,616
SOCIAL NET BENEFITS	21,604

from recreational investment in the Forest Reserve.

Evidence of Conflict

When competition for the use of land is intensified, the conflict is felt by all uses. In Southwestern Alberta the results of competitive uses are experienced by landowners, recreationists, and administrators alike. Competition also has implications for resource management and conservation decisions.

From the sample, only 8 percent of the ranchers felt there were no hunters on their property in an average year. The average number of hunters per ranch was estimated at 144 per year.[1] The number of hunters per ranch ranged from zero to 1,500. Estimates of hunting numbers, as well as angling numbers, must take into consideration that 48 percent of the ranches have some land posted and 30 percent of these post more than one-half of their property thus restricting the areas of public access. The majority of the signs read "No Trespassing".

The response to trend in hunting pressure was: 66 percent of the ranches felt that hunting pressure had increased in the last five years; 20 percent felt there had been no change; and 14 percent felt that pressure from hunting had decreased in the vicinity of their ranch. These results have to be tempered with the fact that hunting pressure is not evenly distributed, but tends to focus in those areas offering a higher chance of success and greater accessibility.

Like hunting, angling is even more uneven in pressure distribution.

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[1]The terms ranch or property refer to all land under the management of the particular rancher. This includes deeded, leased, and rented land but not permit land.

The miles of accessible fishing stream per ranch greatly influences the angling pressure felt. Fifty-eight percent of the ranchers had no anglers on their property. Of the 42 percent who do have fishing streams on their property, the number of anglers per ranch was estimated at 250 per year. Sixty-six percent of the ranchers felt that fishing pressure in the vicinity of their ranch was on the increase.

In general ranchers were unable to distinguish between anglers, campers, and picnickers, often feeling they were one and the same. Campers were not generally a problem, although 26 percent of the ranchers felt a few use their property each year. Sixty-six percent of the ranchers thought that the numbers of campers and picnickers were increasing, while 18 percent felt there was no noticeable trend in their area.

Appreciating the fact that inconvenience caused by recreationists (hunters, anglers, campers, and picnickers) is extremely difficult to evaluate in dollar terms and that, for the purposes of compensation, the person or business experiencing a loss rarely is allowed to estimate the value of the loss personally, the ranchers in the Southwest were asked to evaluate the losses they experienced due to damage and inconvenience caused by recreationists on their property. The value so obtained gave an indication of the magnitude of the inconvenience. Four percent of the ranchers found it impossible to evaluate the inconvenience; 38 percent felt that recreationists did no damage or caused negligible inconvenience; 58 percent felt some damage or inconvenience had been caused by recreationists. This damage was evaluated at approximately 187 dollars per ranch over all ranches and approximately 827 dollars per ranch for those ranches experiencing inconvenience. Again

these figures must take into consideration the fact that 48 percent of the ranches have some posted land.

The general reasons for posting and for evaluating damages were for inconveniences imposed by recreationists such as down gates, broken fences, the threat of fire, litter, unnecessary off-road vehicle traffic on pasture land, threats to livestock, etc. Rustling, while not counted in the evaluation of damage, was felt to be increasing by 28 percent of the ranchers, while 66 percent felt there had been no change and 6 percent felt that losses from rustling were decreasing in their area. In general the ranchers found the task of differentiating sportsmen from other strangers difficult. Usually, the ranchers wanted to know what activities were occurring on their property and many indicated recreationists would be welcome on their property if permission was requested. The landowners are, in effect, bearing some of the costs of providing a recreational experience for recreationists while gaining no benefits from it. On an aggregate basis for all ranches in Southwestern Alberta this cost amounts to an estimated 141,100 dollars per year.[1]

Ranchers in the Southwest also provide feed and habitat for the wildlife of the region. Forty-six percent of the ranchers feel that wildlife impose costs on their ranching operation. Fifty-four percent feel that wildlife impose little or no costs on their operation. These results have to be tempered with the consideration that the population of wildlife, particularly ungulates, is not evenly distributed over the entire region. Some animals, for instance, elk, are known to cause

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[1]For a discussion of the calculations used to arrive at these values see Appendix D.

problems in localized areas in the winter season. The estimated average costs due to wildlife damage amounts to approximately 149 dollars per year per ranch in the Southwest. On the aggregate this cost amounts to 112,308 dollars per year for the ranches in Southwestern Alberta.[1]

The costs imposed by recreationists and by wildlife combined amount to 253,400 dollars per year. Fifty-six percent of this total is contributed by recreationists and the remaining 44 percent by wildlife. These are direct costs, paid by the landowners, and should be accounted for in the benefit-cost analysis of wildlife, fishing, and recreational resources. These costs are not included in the benefit-cost table as they have not been estimated by a reliable third party assessor and also there are inconsistencies in estimating benefits and costs. No estimates of the benefits from recreational use of land outside of the Forest Reserve and the Provincial Parks are included, although costs attributed from this use have been estimated by the landowner. These points illustrate that caution must be exercised in interpreting the quantified values presented.

Increasing hunting pressure also has implications from a wildlife management viewpoint. The ranchers estimated the total hunting pressure to be approximately 100,000 days as opposed to an estimated 84,000 days from hunting data.[2] The rancher estimates of total hunter population, numbers of game harvested, total game population, and harvest ratio are reasonably close to Fish

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[1] See Appendix D.

[2] The 84,000 hunting days is from Miller, Alberta's Hunting and Fishing Resources, p. 29.

and Wildlife officials' estimations (Table 4.13).[1] On this basis the ratio of game to hunters should also be accurate. The ranchers estimate that on their property there are over two times as many total hunters as there is total big game. Again caution is advised as neither hunter nor big game is evenly distributed over the entire region. However, even with pressures of this magnitude on game, 34 percent of the ranches estimated big game numbers were increasing, 44 percent estimated game numbers were constant, and 22 percent estimated game numbers were decreasing. The Fish and Wildlife Division feels that there has been a small decline in numbers in the last five years.[2]

Conflicts in use are even occurring among sportsmen. Competition between hunters in one particular instance has been documented during a three day cow-elk season in a small portion of W.M.U. 400.[3] The hunter concentration was so high hunters were having difficulty finding places to park and many hunters who were planning to stay the full three days left the area after the first day. Approximately 720 hunters with 127 carcasses passed through the two check points which represented the only exits out of the designated hunting area.

The major constraint on increasing or at least maintaining the wildlife and fisheries population is deemed to be habitat. All the

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[1] Dave Neave, Wildlife Biologist, Division of Fish and Wildlife, Personal Interview, Edmonton, June, 1972.

[2] Morely Barrett, Wildlife Biologist, Division of Fish and Wildlife, Lethbridge, Personal Communication.

[3] T.A. Wendland, Fish and Wildlife Officer, Pincher Creek, Division of Fish and Wildlife, in Memorandum to E.J. Psikla, Assistant Administrator, Division of Fish and Wildlife, January, 1972.

TABLE 4.13

ESTIMATED GAME HARVEST IN SOUTHWESTERN ALBERTA

Game Species	Hunter Estimate[a]	Rancher Estimate	Rancher Estimated Percent Harvested
Elk	1,428	2,273	14.4
Moose	1,076	576	13.8
Deer	3,087	4,833	17.4
Total	5,591	7,682	16.1

[a]Miller, Alberta Hunting and Fishing Resources, pp. 46-49.

biologists consulted stressed the overriding importance of habitat.[1] Ranchers have been improving range and this usually involves clearing to some degree. The destruction of fish habitat is seen as a result of increasing silt loads in the streams. Siltation is especially destructive to trout habitat. While agriculture (ranching) is not the only cause of habitat destruction, it is one of the major causes.[2] Ranchers were generally not aware of these deletorious effects from their operation.

[1]Morley Barrett and D.S. Radford, Biologists, Division of Fish and Wildlife, Lethbridge; Harold Carr and Dennis McDonald, Biologists, Division of Fish and Wildlife, Calgary; Gordon Kerr, Director, and D. Neave, Biologists, Division of Fish and Wildlife, Edmonton.

[2]S. Clements, Some Physical and Biological Features of Flowing Waters in the Lethbridge Fisheries Subdivision; Dennis McDonald, Division's Policy Regarding the Protection of Trout Streams from Poor Land Use Practices on Private Land, Interdepartmental memorandum to C.E. Stenton, Senior Management Biologist, Division of Fish and Wildlife, Department of Lands and Forests, Edmonton, 1971.

In Southwestern Alberta conflicts are resulting from increased competition for land resources. These conflicts indicate a misallocation of the economic resources in the area and an inequitable sharing of benefits and costs. As two of the major uses of the resources are of a public nature, policy makers are required to develop policies that will lead to both a maximization of social net welfare and to a settlement of conflicts.

This section has attempted to point out those land uses in the Southwest that are inefficiently utilizing the resources and to point out those sectors where additional units of resource will provide for net increases in public welfare. It has also been pointed out that all costs are not being borne by those to whom benefits are occurring. The next step is to examine the benefits and costs of reallocating resources in the indicated direction.

Evaluation of Shifting Resource Use

From the section on the evaluation of resources, the economic efficiency of most ranches from a public viewpoint is questionable. The public sector has a stake in the land utilization by ranches in that crown lands make up a substantial percentage of land under ranching use. This crown land is in the form of longterm leases or yearly grazing permits. The public policy makers could decide that this land would be more efficiently utilized in other capacities--notably wildlife habitat and recreation. In fact, the unofficial belief in the Forest Service is that within five years there will be no cattle in the Forest Reserve. What effect will this have on the ranching sector and what effect will this have on recreation and wildlife?

The average grazing permit per ranch in the Forest Reserve is 200 A.U.M.'s. Loss of this permit grazing will result in either a reduction of the number of livestock per ranch or rental of grazing land from other sources. This loss will directly affect 44 percent of the ranchers. As all crown range is currently being utilized, the source of rental will have to be private range. The cash rental for private native range is estimated to be approximately 2.55 dollars per acre per year which corresponds to approximately 4.10 dollars per A.U.M.[1] At this price the net cost to the average rancher would be 1,020 dollars annually. Aggregated over all ranches the cost would be 77,418 dollars per year. Considering the level of range management currently existing in the Forest Reserve, a direct benefit of this magnitude or greater resulting from recreation or wildlife is difficult to envisage. The fact that competition between livestock and wildlife exists in some locales is acknowledged, but excessive competition over the entire Reserve is unlikely. More intensive management of both domestic livestock and wildlife, as well as the pin-pointing of distinct areas of competition, will likely yield a more beneficial solution at less cost to society. With correct management a great deal of compatibility is believed to exist between these resource uses.

The average ranch holds 818 acres of crown lease. Reallocation of much of this land toward more profitable uses is a possibility that has to be considered. No doubt existing negative returns per acre also prevail for grazing lease due to the spreading of fixed costs over all land. Crown lands were originally designated as agricultural lease since they

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[1] Moncrieff and Phillips, "Economic Status of Cattle Ranching in Southwestern Alberta".

were of marginal value for any other use. As the leases do not generally occur in large tracts, but in isolated parcels, they are, in many cases, managed in association with surrounding private land. In certain instances private land only has value due to the lease, and vice versa, due to water and/or accessibility. Thus, for all intents and purposes, lease is treated as private land. The costs of denying the ranching sector use of crown lease would almost certainly be greater than any benefits that could be attributed to the utilization of lease for other purposes. However, there does appear to be a case for greater accessibility and use of leased land for the general public.

Summary

The purpose of this chapter was to evaluate land allocation in Southwestern Alberta in its present form and, upon finding indications of misallocation, to look at incremental changes in use that would enable society to move closer to an optimum allocation.

Ranching in Southwestern Alberta appears to be a poor social investment in many instances where returns per acre are low or negative, particularly among smaller operations. Recreational use, as typified by the Provincial Parks, appears to be a social net cost to society. But recreational use, as typified by the simple recreational pursuits available in the Forest Reserve, appears to return a substantial social net benefit and should increase each year. Wildlife and fishing use return a very positive social net benefit.

The public pursuit of recreational activities, including hunting and angling, in Southwestern Alberta is an increasing phenomenon. On a relative area basis the region has been shown to be one of the heaviest

hunted areas in the Province. Ranchers in the Southwest have reacted to this increasing pressure by posting their land. Currently 48 percent of the ranchers post some land and further posting appears imminent as 58 percent of the ranchers interviewed felt some inconvience caused by recreationists. The costs estimated by the ranches directly applicable to recreationists were 141,000 dollars annually. The cost directly attributable to wildlife was 112,000 dollars as estimated by 46 percent of the ranchers. The landowners in the Southwest have very little economic incentive to provide for the recreational or the wildlife resources in the region.

The immediate conclusion is that public planners should attempt to reallocate resources away from ranching and park types of recreation into wildlife, fishing, and Forest Reserve forms of recreation. There are, however, other considerations. Benefits and costs are not being shared on an equitable basis and there appears to be a great need to realign the indience of benefits and costs. The prime example of this is the fact that ranchers are bearing some considerable costs in providing feed and habitat for wildlife and are also experiencing considerable costs as public licensees pursue a common property resource over privately controlled property. Currently the landowner has very little economic incentive to provide for wildlife in any form. In addition, the public is paying, through taxation, the Provincial Park costs that are not covered by the benefits accruing from these parks. Another consideration is that a rapid removal of crown property from ranching use to other uses would very likely be more costly than beneficial. Certainly over the long term the allocation process should be shifted

toward those uses which yield the most economical return, but a complete reallocation program should not be attempted without making an effort to reconcile competition between uses that could easily be complementary. Most of the competition is of an institutional nature and not of a biological nature. In short, new directions in resource management need to be pursued. Suggestions as to these new directions will be presented in Chapter V. As has become apparent, Southwestern Alberta is the area of highest conflict in the Province at the moment and new policies are needed now to prevent the conflicts from developing in other areas of the Province.

CHAPTER V

POLICY SUGGESTIONS AND FURTHER RESEARCH

Policy Suggestions

In order for pragmatic research to be meaningful and effective, the conclusions of research studies have to be implemented. Conclusions can often be restated in the form of practical policy suggestions and in this way facilitate the implementation of these conclusions. This section attempts to state policy suggestions that will enable the resolution of conflicts in resource use in Southwestern Alberta. However, the resolution of conflicts has to be approached in a manner that attempts to maximize social net benefits over time. This is not an easy task and is perhaps one reason why government has not acted in this regard.

Restated, the economic problem is to align benefits with costs while reallocating resources according to marginal returns. In the short term more intensive resource management will enable resources to be used in a complementary fashion. In the long term the growing uses of the resources will necessitate a greater degree of single use allocated by efficiency of use criteria. However, at no time should public planners lose sight of the inherent complementarity of resource uses.

This study has identified that, in the aggregate, ranching provides poor economic returns to land (although income on a cash flow basis provides a reasonable standard of living), while recreation and wildlife return significant net social benefits. Conflicts of use are occurring among these land resource uses and will in all likelihood continue to occur on a larger scale. Immediate barring of cattle grazing in the Forest Reserve and on crown lease would incur a net social loss. In the

short term, the existing complementarity of the resource uses can be exploited to realign benefits and costs if certain policy measures are taken. Conflicts among ranching, hunting and fishing, and other recreation interests are currently precluding certain complementarity of resource uses. At the same time there are locations within the region where biological competition exists. Public policy changes should attempt to resolve both the social conflict and the biological aspects. Short term policies should be consistent with long term goals. Several policy suggestions are presented below.

Ranching Policy Suggestions

Ranchers require control over activities that take place on their deeded property. The new Surface Rights legislation should insure increased protection for private property and eliminate the need for rancher protective associations. Ranchers could be further encouraged to allow wildlife development and recreational access. In this regard, ranchers could be offered public incentives to create and maintain favourable wildlife habitat and to allow public pursuit of the resulting game. This program could be based on habitat available on the ranch and thus allow the program to be concretely based on the quantity and quality of the habitat. Cost of such a program could be met from the substantial net social benefits occurring to hunters and anglers. The program could involve three elements of solution, that is through user fees or public subsidies or a combination of the two. Care should be given to the effects of the use of any one of the alternatives. The improved habitat resulting should provide for an expansion of the wildlife resource. Increased public access should be permitted as long as the landowners are

protected against possible increased costs to them. Policy measures concerning this latter aspect are discussed in the section below.

Currently, ranch property should include crown lease as well as deeded land. This stipulation is necessary due to the inherent problems associated with leases. Leases are often small units of land that are managed as part of a larger land unit or are accessible only by crossing deeded land. The current legal lease agreements for crown land are little different from private lease agreements in that the leasee has property rights (except ownership) similar to those of a private land owner on patented land.

In the future, as lease agreements terminate, new agreements could be negotiated with the rancher for consolidation into one piece of leased land by exchanging deeded land with crown land. With care the lease could be consolidated in such a manner as to include the prime game habitat and to assure relatively easy access by members of the public. In this manner recreational activities could be relatively well confined to crown property thereby enabling the rnacher to escape potential conflict problems. The rancher could be allowed grazing rights to the lease, but perhaps for a specified period only. This process could provide a mechanism for the gradual withdrawal of public land from an economically inefficient use while providing for land management for differing uses. A procedure should be instituted that would allow a leasee to relinquish his lease to the crown without monetary loss. The lease has a value, or at least imparts a higher value, to private land that can only be obtained through the sale of the lease to another rancher for grazing use. If the crown wishes to withdraw the lease from grazing

use, an equitable settlement with the leasee should be negotiated.

Wildlife Management Policy Suggestions

The direct ownership of wildlife in the Province of Alberta should be maintained by the Crown. The particular mix of many private owners, along with crown ownership of land, would make identification of ownership of mobile private game species very difficult if free roaming species are to be maintained. The territories of game species do not coincide with legal land boundaries. Private land owners are required to have an interest in game production, but this interest could be better provided by the provision of habitat than by the provision of game ownership. In this regard the Fish and Wildlife Habitat Fund enabling legislation should be implemented by the Fish and Wildlife Division with little delay. Winter wildlife range and fish breeding should receive top priority.

Alberta should begin a program of certification and training for all sportsmen. The acquired certificate could be a prerequisite for the granting of game licenses. This program could be initiated by requiring all violators of wildlife regulations to produce certification before recovering their game licenses. A certification program would greatly improve the quality of hunting in the Province and could possibly result in improved hunter-landowner relations.

An agreement on the setting of hunting seasons in the Forest Reserve should be negotiated between officials of the Forestry Service and the Division of Fish and Wildlife. This agreement could, for example, ensure that there are no livestock remaining in the Reserve during hunting season. This could do much to promote resolution of conflict.

Wildlife has to be more intensively managed on a smaller scale. Smaller wildlife management units and greater knowledge of game numbers, structure, and distribution are required. The value of female hunting seasons should be seriously considered before being used as a management tool. Although ranchers were found to overestimate game populations, they still felt there was little need for female seasons. Misunderstanding of the purpose of such seasons was also common. In certain instances an attempt could be made to utilize limited accessibility as a management tool.

Further emphasis should be placed on the illegality of hunting from vehicles.[1] The hunter should be encouraged to hunt on foot. This would substantially reduce problems of vehicle damage to domestic range. While hunters appear to concentrate on regions where success is more probable, attempts should be made to spread hunters over the region or not to encourage high concentrations of hunters.[2] While providing a higher quality of recreational experience, conflicts between sportsman and landowner could be minimized.

General Land Management Policy Suggestions

The development of recreational areas should be encouraged. Developments of this type tend to draw the recreational pressure off

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[1] In the 1972 hunting season it will be illegal to fire a gun within 50 years of a vehicle on any municipal road, main or secondary highway, in any prairie or parkland wildlife management unit. Dr. A. Warrack, Minister of Lands and Forests in Edmonton Journal, June 17, 1972, p. 63.

[2] In the 1972 hunting season several hunting seasons have been adjusted to run concurrently and the number of licenses available to each hunter has been restricted. This should have a non-concentrating effect. Dr. A. Warrack, Minister of Lands and Forests, in Edmonton Journal, June 17, 1972, p. 63.

private land. For example, the fishing pressure on surrounding land was relieved by the development of excellent angling opportunities within Chain Lakes Park.

The Forestry Trunk Road should not be improved until safety considerations make improvement necessary. Increased recreational access would increase costs and pressures on recreation as well as on other uses. When the road is improved, management of these other uses will have to be improved and/or changed as well, or increasing conflicts will result. Orderly development of recreational areas will also be necessary in order to channel recreationists to these areas.

Perhaps the major point being made in this section is that land is used for many purposes in Southwestern Alberta and an integrated land management program is required. Individual land use decisions can no longer be made in isolation. Increased cooperation and understanding of problems by all interested groups, as well as the public at large, would go a long way towards facilitating the minimization of conflict and the maximization of net social benefits over time. The divergence of opinions among interest groups appears to be based more on mistrusts than on basic differences and is, therefore, solvable. Communication would also facilitate orderly change and development.

Further Research

This study has approached land use problems in Southwestern Alberta on a broad scale. While such a scale is necessary for a first step, much more detailed work is necessary to pin-point specific areas of current recreation, wildlife, and agriculture problems. More research into wildlife in the Southwest is urgently needed, as is more information

on recreation within the Forest Reserve. In addition, attempts to measure the value of wildlife to those other than hunters and anglers, as well as the option value of the recreational and wildlife resources, should be encouraged.

If payment of incentives and compensation to ranchers as recommended in this study is the final policy choice, much research must be done to describe the most equitable method of compensation. Also of interest from a public policy viewpoint would be the scale of ranch that offers the best economic returns.

A serious look at the Provincial Parks in the region is required since the social benefits from these parks are considerably less than the associated costs. Does the problem lie within excessive costs or with the lower quality of the recreation experience? These and many other questions have to be answered in the future.

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APPENDICES

APPENDIX A

FORESTRY RECREATION AREAS

TABLE A-1

ALBERTA FOREST SERVICE RECREATION AREAS

Crowsnest Forest Recreation Areas	Bow River Forest Recreation Areas
Allison	Beaver Flat
Beaver Mines Lake	Canyon Creek
Big Falls	Cataract Creek
Chinook	Cat Creek
Canyon	Eau Claire
Cutch Creek	Elbow Bridge
Livingstone Falls	Gooseberry Flat
Indian Grave	Gorge Creek
Lynx Creek	Highwood
Oldman River	Kananaskis Lakes
Racehorse	Loomis Creek
Syncline	North Fork
Honeymoon Creek	Ribbon Creek
	Sandy McNabb
	Sibbald Park
	Spray Lakes

[1]Areas listed are only those occurring within the study region.

APPENDIX B

RANCH BUDGET TABLES

TABLE B-1

AVERAGE INVESTMENT IN RANCH ASSETS[a]

Investment Item	All Ranches	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
	Average Dollars Per Ranch		
Buildings and Equipment	40,000	19,700	45,800
Livestock	96,300	32,900	85,400
Land[b]	225,400	99,400	220,200
TOTAL	361,700	152,000	351,400

[a]Prices of investment items were based on current market values as estimated by the ranchers.

[b]Investment in land was derived from the price of land as estimated by the ranchers. Investment in land is not included in further calculations.

TABLE B-2

RANCH OPERATING RECEIPTS

Income Source	All Ranches	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
	Average Dollars Per Ranch		
Cattle Enterprise	48,000	14,900	44,300
Minor Livestock Enterprises	540	130	400
Grain Sales	1,600	1,900	2,100
Hay Sales	170	100	320
Less Purchased Livestock	7,780	1,810	8,210
Less Purchased Feed	750	450	580
Net	41,780	14,770	38,330
Custom Work	60	130	20
Rental	300	0	670
Gross Operating Revenue	42,140	14,900	39,020

TABLE B-3

RANCH LABOUR CHARGES

Type of Labour	All Ranches	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
	Average Dollars Per Ranch		
Operator Labour[a]	3,900	3,730	3,960
Family Labour	1,620	980	2,320
Hired Labour[b]	2,230	370	1,080
TOTAL	7,750	5,080	7,360

[a]Operator's labour was valued at 300 dollars per month as used by the Alberta Department of Agriculture.

[b]Hired labour was utilized as given by the rancher. In cases where room and board were not included, 50 dollars per month was charged as is consistent with Statistics Canada.

TABLE B-4

RANCH EXPENSES

Expense	All Ranches	Ranches With 500 - 1,499 Acres	Ranches With 1,500 - 6,000 Acres
	Average Dollars Per Ranch		
Cash Operating Expenses[a]	24,670	9,520	26,290
Labour	7,750	5,080	7,360
Investment[b]	8,180	3,260	7,980
Management[c]	3,370	1,190	3,120
Total Expenses	43,970	19,050	44,750

[a]Operating expenses include all cash expenses plus a 10 percent depreciation charge on total investment on buildings and equipment.

[b]Investment expense was calculated as an opportunity cost of capital invested in buildings, equipment, and livestock. The interest charge was 6 percent.

[c]Management expense was estimated by using 8 percent of Gross Operating Revenue.

TABLE B-5

NET RETURN AND CAPITALIZED VALUE PER ACRE
FOR SAMPLE RANCHES

Ranch Number	Ranch Type*	Net Return Per Acre	Capitalized Value Per Acre**
		- Dollars -	
1	c	7.68	128
2	c	2.77	46
3	b	-6.30	-
4	c	-1.22	-
5	c	6.63	110
6	b	-5.08	-
7	c	-0.88	-
8	b	-2.12	-
9	c	6.56	109
10	c	1.26	21
11	b	0.54	9
12	c	6.46	108
13	c	-3.09	-
14	b	-2.19	-
15	b	-1.80	-
16	c	4.67	78
17	c	-6.92	-
18	b	3.65	61
19	b	0.59	10
20	b	-1.17	-
21	b	-2.05	-
22	a	-6.87	-
23	b	1.05	17
24	c	-2.84	-
25	c	0.87	14
26	c	-7.34	-
27	d	2.43	40
28	a	-23.66	-

Continued ...

Ranch Number	Ranch Type*	Net Return Per Acre	Capitalized Value Per Acre**
		- Dollars -	
29	b	-0.70	-
30	c	1.33	22
31	b	-2.43	-
32	c	2.55	42
33	b	-1.20	-
34	c	0.61	10
35	b	-0.48	-
36	a	-6.40	-
37	b	-9.20	-
38	b	-1.39	-
39	d	5.37	89
40	b	-5.67	-
41	b	-8.44	-
42	d	-0.82	-
43	d	4.24	71
44	d	1.57	26
45	d	3.52	59
46	c	-1.27	-
47	d	1.88	31
48	c	-2.42	-
49	d	11.85	197
50	b	-3.53	-

* a = Ranches less than 500 acres in size including deeded, rented, and leased land, but excluding Forest Reserve Permit land.
b = Ranches of 500 to 1,499 acres in size.
c = Ranches of 1,500 to 6,000 acres in size.
d = Ranches greater than 6,000 acres in size.

** Interest rate used for capitalization was 6 percent. Formula used to arrive at capitalized value was:

$$\text{Capitalized value per acre} = \frac{\text{net return per acre}}{6\%} .$$

APPENDIX C

FORESTRY TRUNK ROAD TRAFFIC COUNTS

FORESTRY TRUNK ROAD TRAFFIC COUNTS

Intersection and Date	24 Hours Count Private Vehicles
Junction with Highway 1	
Sunday August, 1970	365
Monday August 10, 1970	250
Friday December 18, 1970	109
Sunday December 20, 1970	236
Tuesday July 6, 1971	361
Highwood Crossing	
Monday June 22, 1970	
North Road	48
South Road	78
Longview Road (east)	67
Friday August 14, 1970	
North Road	80
South Road	103
Longview Road (east)	110
Sunday August 16, 1970	
North Road	267
South Road	331
Longview Road (east)	283
The Gap (Oldman River Junction)	
Friday June 18, 1971	
North Road	24
South Road	32
East Road	13
Trunk Road North of Coleman	
Friday June 18, 1971	91
Weekday August, 1969	48

Source: The above data were supplied by the Planning Branch, Alberta Department of Highways from traffic counts.

FORESTRY TRUNK ROAD TRAFFIC COUNTS

Intersection and Date		Vehicle Count
Trunk Road North of Highwood Junction		
1969	May	785
1969	June	2,665
1969	July	4,562
1969	August	6,888
1970	August	6,866
1970	September	3,381
1970	October	734
Trunk Road at Kananaskis Ranger Station		
1969	August	5,243
1970	June	2,981
1970	July	6,990
1970	August	7,195
1971	September	3,220
Johnson Creek Road at Willow Creek Bridge		
1963	August	302
1969	August	2,186
Trunk Road at Livingstone Ranger Station		
1970	July-August	11,238
Castle River Ski Resort		
1970	January 7 - April 7	6,684

Source: The above data were supplied by Forest Land Use Branch, Alberta Forest Service.

APPENDIX D

RECREATION AND WILDLIFE DIRECT COSTS ON RANCHERS

COSTS IMPOSED ON RANCHERS BY RECREATIONISTS
AND WILDLIFE AS REPORTED IN SAMPLE

Ranch Number	Wildlife Costs	Recreation Costs	Ranch Number	Wildlife Costs	Recreation Costs
1	0	100	26	100	0
2	0	0	27	250	0
3	0	NA	28	0	0
4	1,000	100	29	50	30
5	300	100	30	2,000	200
6	200	50	31	0	50
7	250	200	32	50	500
8	50	0	33	0	0
9	150	50	34	0	0
10	50	50	35	50	0
11	NA	NA	36	0	150
12	500	500	39	0	0
13	0	0	38	0	500
14	0	0	30	200	200
15	0	25	40	0	100
16	0	0	41	0	0
17	50	65	42	0	0
18	50	0	43	500	500
19	0	500	44	1,000	2,000
20	0	750	45	0	50
21	0	200	46	7,000*	1,000
22	0	0	47	0	0
23	0	0	48	100	500
24	200	100	49	0	10,000*
25	200	0	50	0	600

*In the calculations these estimates were ignored as they seemed to be extremely high and had an unduly large effect on the average per ranch.

CALCULATIONS:
To arrive at dollars per ranch for costs imposed by recreationists and wildlife, the estimates were totalled and divided by 49 (ignoring one ranch in each case). To arrive at an estimate for the total population from this random sample the total costs from the sample were divided by the sample percentage of 6.5.

APPENDIX E

LICENSE FEES AND BAG LIMITS

LICENCE FEES[1] AND BAG LIMITS - 1969

Licence	Fee	Bag Limit
Resident Moose	5.00	1 moose & 1 black or brown bear
Resident Moose Area 1	5.00	1 moose in Big Game Zone 1
Resident Elk	5.00	1 elk & 1 black or brown bear
Resident Whitetail Deer	3.00	1 whitetail deer
Resident Mule Deer	3.00	1 mule deer
Resident Sheep	7.50	1 trophy sheep
Resident Non-Trophy Sheep	5.00	1 non-trophy sheep
Resident Caribou	7.50	1 caribou
Resident Spring Bear	5.00	1 grizzly bear & 2 black or brown bear in the spring season
Resident Grizzly Bear	7.50	1 grizzly bear
Resident Bird Game	2.50	*
Nonresident Big Game	75.00	1 trphy sheep, one antlered animal & 1 black or brown bear
Nonresident Alien Big Game	150.00	1 trophy sheep, one antlered animal & 1 black or brown bear
Nonresident & Nonresident Alien Special Licence	50.00	1 moose in Zone 1
Nonresident & Nonresident Alien Spring Bear	25.00	1 grizzly bear & 2 black or brown bear
Nonresident & Nonresident Alien Whitetail Deer	15.00	1 whitetail deer
Nonresident Bird Game	5.00	*
Nonresident Alien Bird Game	25.00	*
Resident Fish	3.00	*
Nonresident Canadian Fish	3.00	*
Nonresident Non-Canadian Fish	10.00	*
Limited (three-day) Non-Canadian Fish	3.00	*

[1]All hunters must purchase a Wildlife Certificate at a cost of $2.00.

*Variable bag and possession limits depending upon the species of bird game or fish.

APPENDIX F

ANIMAL UNIT CONVERSION FACTORS

ANIMAL UNIT CONVERSION FACTORS

Class of Animal	Conversion Factors
Mature Cow with Calf	1.00
Mature Bull	1.25
Weaned Calf	0.60
Yearling (12-17 months old)	0.70
Two-year Old (22-32months)	0.90
Mature Ewe with lamb	0.20
Ram	0.20
Grown Horse	1.25
Elk	0.70
White-tail Deer	0.14
Mule Deer	0.20

Source: Range Term Glossary Committee, American Society of Range Management, A Glossary of Terms Use in Range Management (Portland: American Society of Range Management, 1964).

APPENDIX G

RANCHER QUESTIONNAIRE

The included questionnaire has been abridged by the deletion of comment space following open-ended questions.

Multiple Land Use Study Questionnaire No. ____

CONFIDENTIAL: ALL aspects of the information obtained in this study will remain confidential and NO individual respondent will be identified.

Section I

How many years have you been operating a farm or ranch? (check one).

(a) 30 or more _____
(b) 20 - 29 years _____
(c) 10 - 19 years _____
(d) 1 - 9 years _____

How many years have you been operating this holding? (check one).

(a) 20 or more _____
(b) 15 - 19 years _____
(c) 10 - 14 years _____
(d) 5 - 9 years _____
(e) less than 5 _____

Which statement would best describe how this holding is owned? (check one).

(a) individual owner _____
(b) partnership _____
(c) incorporated _____

In which category would you classify yourself? (check one).

(a) full-time operator _____
(b) part-time operator _____
(c) manager of an incorporated farm _____

Section II. Land Inventory

How many acres are managed in this ranch (including all land rented and leased by you from others)?

_____

How many of these acres are owned? _____

What is the current estimated total market value of this owned land?

(a) including buildings _____

(b) excluding buildings _____

What is the assessed value of the owned land for taxation purposes?

_____

Do you rent land to others?

(a) Yes _____

(b) No _____

Do you rent any land from the Lands Division of the Department of Lands and Forests?

No _____ Yes _____ If yes: Lease _____ Permit _____

What is the carrying capacity of the leased lands? _____

How many acres do you lease or are your share of the lease? _____

Before 1970 what was the normal annual rental you paid? _____

How much rental did you pay last year? _____

How much municipal tax did you pay last year (1970) on your leased land?

_____

What is the normal grazing season? _____

How much do you normally pay per year for improvements on the leased land? (fencing, trails, water, seeding, etc.).

_____

Do you normally cut any wild hay on public lands? Yes ____ No ____

If yes: What rental do you pay?_____

At how much do you value the hay?_____

Do you have a permit to graze on any Forest Service land?

Yes _____ No _____

How many A.U.M.'s are specified?_____

Approximately what is the acreage grazed?_____

How much rental do you normally pay for this grazing?_____

I would like to ask you about land you rent to others (land not included in management unit discussed previously).

Parcel	Acres	Type of Land	Estimated Current Market Value	Assessed Value	Length of Lease	Type of Rental	$ Value of Rent
Total							

Do you rent land from private owners (include Federal and Municipal)? Yes _____ No _____

I would like to ask about land you rent from private owners (include Federal and Municipal Lands).

Parcel	Acres	Type of Land *	Estimated Current Market Value	Length of Lease	Type of Rental	$ Value of Rent	Carrying Capacity (in A.U.M.)
Total							

* Type of land: cultivated, improved pasture, hayland, native pasture.

Do you feel that you are getting a reasonable return above the costs of the lease or permit? Comments:

How do you feel about the terms and conditions of the lease or permit? Comments:

What trend do you foresee in the use of public lands that are now grazed? How will this trend affect you? Comments:

How many acres are there on your ranch building site? _____

I would now like to ask about your cultivated acres (total land).

	acres	average yield	amount sold	estimated value of sold
Cash crops (wheat, rape, etc.)	_____	_____	_____	_____
Oats	_____	_____	_____	_____
Barley	_____	_____	_____	_____
Other feed grain	_____	_____	_____	_____
Summerfallow	_____	_____	_____	_____
Oat sheaves	_____	_____	_____	_____
Tame Hay	_____	_____	_____	_____
Improved pasture	_____			
Total cultivated	_____			

I would like to ask about your unimproved land. How many acres of the total unimproved land managed by you are:

Summer range _____

Winter range _____

Wild hay _____ Amount sold _____ Value _____

Waste land _____

How many of the acres managed by you could be improved by brush irradication?

(a) _____ acres (b) brush type _____

Section III. Livestock Inventory

What is the breed of your foundation stock?

Cows - Hereford _____ Swine _____
Shorthorn _____
Angus _____
Charlois _____
Simmental _____
Mixed _____
Other _____

Bulls - Hereford _____ Horses _____
Shorthorn _____
Angus _____
Charlois _____
Simmental _____
Mixed _____
Other _____

Could you give me some idea of the number and value of the animals that you normally carry?

	Number	Estimated Market Value
Beef cows	_____	_____
Milk cows	_____	_____
Bulls	_____	_____
Calves	_____	_____
Yearling heifers	_____	_____
Yearling steers	_____	_____
Two-year heifers	_____	_____
Two-year steers	_____	_____
Sheep	_____	_____
Swine	_____	_____
Horses	_____	_____
Poultry	_____	_____

At weaning time what would be your average calf crop? _____

How do you usually market your cattle?

(a) as feeder calves 6-7 months of age _____

(b) as feeder yearlings at 18 months of age _____

(c) as fattened cattle for slaughter _____

(d) other: _____

_____

Could you give me an idea of your livestock transactions in a normal year?

Livestock sold	Number	Value
Bulls	_____	_____
Cows	_____	_____
Calves	_____	_____
Feeders	_____	_____
Horses and colts	_____	_____
Other _____	_____	_____
	Total	_____

Livestock bought		
Replacement bulls	_____	_____
Replacement cows	_____	_____
Feeders	_____	_____
Horses	_____	_____
Other _____	_____	_____
	Total	_____

What is the value of dairy products sold in a normal year? _____

What is the value of other products sold in a normal year?
(poultry, eggs, etc.) _____

Could you give an estimate of the value in dollars of the meat and dairy products consumed at home? _____

What percentage of your annual income is derived from the operation of this ranch?

(a) 75 - 100% _____
(b) 50 - 74% _____
(c) 25 - 50% _____
(d) 0 - 24% _____

Section IV. Building and Equipment Inventory

I would now like to ask about your investments in buildings and equipment.

	Present Depreciated Value From Income Tax
Operators residence	
Other buildings	
Other houses	
Cattle barns	
Cattle sheds	
Other livestock shelter	
Garages	
Other machinery housing	
Granaries	
Hay sheds	
Pump house	
Fencing (miles)	
Corrals and shutes	
Sub-total	
Vehicles	
Tractors	
Trucks	
Automobiles	
Sub-total	
Cultivation & Seeding Equipment	
Mold board plow	
Discer	
Cultivator	
Drill	
Seed cleaner	
Weed sprayer	
Harrows	
Sub-total	

	Present Depreciated Value From Income Tax
Harvesting Equipment	
Combine	
Swather	
Binder	
Thresher	
Grain loader	
Sub-total	
Haying Equipment	
Baler	
Forage harvester	
Power mower	
Horse mower	
Side delivery rake	
Dump rake	
Bale loader	
Sub-total	
Miscellaneous	
Front end loader	
Manure spreader	
Rubber draying	
Other draying	
Bulk fuel tank	
Hammer mill	
Grain grinder	
Saddles and harness	
Irrigation equipment	
Gasoline and electric motors	
Milking equipment	
Small tools	
Other	
Aggregate Total	

Section V. Labour

Type of labour		Number used	Number of months used	Cost (including board and room)
Family labour				
Hired labour	Seasonal			
	Full-time			
	Other			
Totals				

Do you supply labour while managing or is your role strictly management?

Labour also _____

Strictly management _____

Do you normally do any custom work and if so how much to your revenue do you receive in a normal year?

Yes _____ No _____ Revenue _____

Section VI. Operating Costs

What are your normal annual operating costs?

	Expenditure (from income tax)
License	
Insurance	
Tires and batteries	
Anti-freeze	
Repairs and servicing	
Fuel, oil and grease	
Small hardware	
Blacksmithing and welding	
Custom work hired	
Electricity	
Feed grain purchase	
Roughage purchased	
Salt and supplements	
Vitamins and antibiotics	

	Expenditure (from income tax)
Livestock sprays and dusts	
Sire services	
Veterinary and medicines	
Seed grain purchases	
Forage seed purchases	
Fertilizer	
Twine	
Seed cleaning and treatment	
Crop sprays	
Land taxes (total)	
Land rents (cash)	
Pasture rentals (permit)	
Building repairs	
Building insurance	
Fencing repairs	
Other real estate repairs	
Membership, legal & accounting fees	
Telephone	
Other	
Aggregate Total	

Section VII. Land Use Conflicts

Normally how many hunters hunt on your property or on the property managed by you, annually? (last 5 years) _____

Is the number of hunters (last 5 years)

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

Normally how many fishermen fish in streams or lakes on your property or on property managed by you, annually? (in the last 5 years)

_____

Is the number of fishermen (in the last 5 years)

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

Normally how many campers camp on your property or property managed by you, annually? (in the last 5 years) _____

Normally how many picnickers picnic on your property or property managed by you? (in the last 5 years) _____

Are the number of campers and picnickers: (in the last 5 years)

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

How many ask permission? (in percentage)

(a) hunters _____

(b) fishermen _____

(c) campers _____

(d) picnickers _____

Are snowmobiles or motorcycles a problem on land managed by you?

Yes _____ No _____

Comments:_____

What trend do you foresee in the problems caused by these motor vehicles?

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

Comments: _____

How much annual damage in dollars do recreationists do to your property and that managed by you? _____

What sort of damage occurs? (fences, animals letter, fire, etc.)

_____

How much and by whom are you compensated for this damage?

_____

How much of the land managed by you is posted and how?

No Hunting _____ No Trespassing _____

(a) 75 - 100% _____

(b) 50 - 74% _____

(c) 25 - 49% _____

(d) 1 - 24% _____

(e) 0 _____

If you post land why do you do so?_____

Generally what is your attitude toward recreationists? (a recap).

_____

Could you estimate the number of big game on the property managed by you?

(a) elk _____

(b) moose _____

(c) deer _____

(d) others (specify) _____

Could you estimate the numbers shot on your property?

(a) elk _____

(b) moose _____

(c) deer _____

(d) others _____

Over the last 5 years what trend in big game numbers is evident on your property?

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

Over the last 5 years what trend in upland game birds is evident on your property?

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

What type of predators are there on your property?

_____

Do predators do any damage to your ranching operations? What type of damage occurs?

_____

What damage does other wildlife do to your operation? (big game, birds)

_____

How much does this damage cost you in dollars?_____

Are you in any way compensated for this damage? How and how much?

_____

How many water improvements and of what type do you have on your property?

_____

How many wet areas have you drained and why?_____

_____

How many acres have you cleared?_____

In what other ways do your current management practices adversely affect other resource uses? (stream bank damage, water quality, erosion due to overgrazing, etc.)

_____

Considering all your current management practices do you encourage or discourage the production of wildlife?

(a) encourage _____

(b) discourage _____

(c) neither _____

Would it be possible for you to increase the production of wildlife?

Yes _____ No _____ How?_____

What type of incentive would be required to enable you to increase wildlife numbers?_____

_____

Would you personally like to see more wildlife and why?

_____

How do you think the recreation and wildlife conflict with ranching can be resolved?_____

How many animal losses do you normally attribute to rustling?

_____

Of what value are these losses? _____

Are your losses to rustling

(a) increasing _____

(b) decreasing _____

(c) remaining the same _____

Whom do you blame for rustling? (neighbours, professionals, etc.)

_____

Do you have any disagreements with the Forest Service over land management for timber production?

_____

Any disagreements with regard to grazing practices in the Forest Reserve?

_____

Does logging in any way affect your ranching operations? How?

_____

Are you compensated? _____

Do you feel your operations or rights are affected by mineral and petroleum exploration? _____

How many wells are on property managed by you? _____

Are you adequately compensated? How much? _____

Do you feel operations are hindered by oil and gas wells, pipelines, and mining? How?

_____

Are you adequately compensated? How much? _____

Are you affected in any way by any activities that take place on adjoining property? How? (campsites, roads, industrial plants).

_____

Comments: _____

_____

_____

_____

_____